

INDIAN SUGAR INDUSTRY

PROBLEMS BEFORE IT.

WITH A FOREWARD FROM

SIR P. C. RAY, C.I.E., Ph.D., D.Sc., F.C.S., F.A.S.B.



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FOREWARD.

The development of Sugar Industry in India is a unique event in the annals of industrial regeneration of this country. The Industry was protected in 1932 and within a short span of 6 to 7 years, its expansion has been quite phenomenal. The production of sugar has increased from 158,581 tons in 1931-32 to about one million tons in 1937-38. The Indian capitalists have invested a sum of over Rupees 30 crores in this Industry and this investment has stopped the drainage of about Rs. 15 crores per annum which amount India had to spend for her annual sugar import. The Industry has conferred a great boon to the cultivators by providing them with a cash crop of over Rs. 8 crores per annum. Moreover, about 12 thousand educated people and over one hundred thousand of skilled and unskilled workers have also found employment due to the expansion of this Industry. The growth of this Industry has fully justified the policy of protection.

But before this Industry could attain its full growth, the Government of India have begun to put various handicaps on its way of proper development. The enhancement of Excise Duty in 1937 against the adverse verdict of the Indian Legislative Assembly, the non-publication of the Report of the Second Tariff Board and the indecisive attitude regarding the question of utilisation of molasses for the production of Power Alcohol are good instances to show the indifferent attitude of the Government. It is, therefore, absolutely essential that sooner the Government of India adopt a more liberal and reasonable attitude towards the problems now facing this Industry, the better would be its footing.

The formation of the Indian Sugar Syndicate Ltd, and its recognition by the Governments of U. P. and Bihar is a right move in the right direction. But what is now needed

is to balance between the production and consumption of Indian sugar. It has been admitted that one of the reasons for which the Industry was overtaken by an unprecedented depression in 1936-37 is over-production. This problem cannot be solved satisfactorily until the production is regulated on an All India basis. This is the most urgent need of the Indian Sugar Industry.

The growth of this Industry in Bengal is of most recent origin and Mr. Mitra has played a very important role as a pioneer in this direction. He happens to be associated with the management of a factory which has the reputation to be a very well managed one. He has, therefore, got the proper opportunity of studying, with a master mind, the different problems now facing this Industry and has put his ideas regarding its different aspects in this volume.

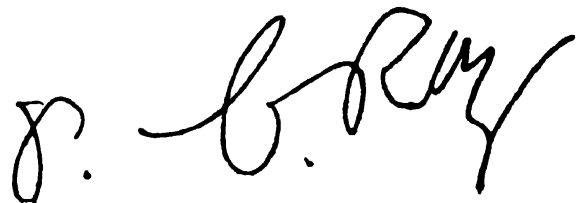
From page to page, the book is replete with a mass of figures and data which prove the tremendous labours he undertook for their collection. Being an expert in this line, he has very ably analysed the statistics and formulated the different useful generalisations out of these figures. A perusal through the different chapters will reveal the fact that he has not only studied the problems of this Industry in India but also of other advanced sugar producing countries of the world. With much pride and pleasure, I can say that he is probably the first Bengalee to undertake the writing of such an authoritative and inspiring book on Indian Sugar Industry and I must say that he has acquitted himself very creditably in his most difficult task. It is quite surprising to note that being very deeply engaged with the management of a factory, he has made time to collect a wide range of materials and statistics which have been required by him to complete this book.

I hope that this volume will be cordially received by the Industry as well as by the public.

Science College,

CALCUTTA,

The 13th of Nov. 1938.

A handwritten signature in black ink, appearing to read 'J. B. Ray', with a stylized flourish at the end.

PREFACE.

The development of Sugar Industry in India is an interesting reading from different points of view. In the first place, it has been demonstrated, beyond all doubts, that being given opportunities, the Indian capitalists are not at all "shy" in investing their capital in industrial pursuits. Within a course of about 7 years since the grant of protection, they have invested a sum of Rs. 33 crores in this Industry. In the second place, it has been proved how State aid can play an important role to foster or retard the growth of an Industry. The enhancement of Excise Duty in 1937 against the Indian public opinion and the Indian Legislature will testify to the said conclusion. Thirdly, the depression which has overtaken this Industry since 1936-37 crop has shown the absolute necessity of co-ordination amongst the different units of the Industry. The formation of the Indian Sugar Syndicate Ltd, is an out-come of this lesson. In the fourth place, a novel piece of Legislation has been enacted in U. P. and Bihar in the shape of the Sugar Factories Control Act to exercise control of the State from the field to the market. The results of working of this Act are, therefore, eagerly awaited by the Industry.

With the expiry of the first stage of protection, the Indian Sugar Industry has been faced with many problems upon the successful solution of which will depend its future. The progress of the Industry has been quite phenomenal as will be evident from the increase in the number of factories since the grant of protection. In 1932-33, the number of the working factories in India was 57 while the present number has gone well above 140. Before the period of protection, India was one of the biggest sugar importing countries in the world but she has now produced more sugar than she needs. She has also maintained a steady progress in the matter of percentage of recovery of sugar from cane. While in 1931-32, the percentage of recovery was 8.89, the same has now attained a level of 9.30 in 1937-38.

But the direction in which an immediate improvement is absolutely essential for the sound footing of the Industry is the production of cane on scientific lines. The average production of cane per acre in India is 15 tons while as much as 45 tons per acre are produced

in other advanced sugar producing countries in the world. It should be remembered that no Industry can ever claim perpetual protection. Further, if the Indian Sugar Industry is to be stabilised, the most immediate need is to focuss our attention on the production of cane on modern lines. Without this, the cost of production of sugar in India can never be reduced to a level which would place this Industry on a good economic footing. The unstinted co-operation of the Industry as well as of the Government is necessary to rehabilitate the entire cultivation of cane in India. The Government of India should immediately respond to the united demand of the Industry to allocate more funds out of the proceeds of Excise Duty. The various Provincial Governments should also concentrate their resources to improve the standard of cultivation of cane in their respective areas. It should be noted here that the best factories in Java could deliver their sugar in Calcutta at Rs. 2/8/- per md. ex-Duty. But it is most disappointing to note that most of the Indian factories have to pay over Rs. 3/- per md. for the price of cane only. This has been possible for Java for the reason that the average production of cane in that country is, on an average, 45 to 46 tons per acre.

Another difficulty which has already confronted the Industry is the over-production of sugar. One of the main causes for the present depression of this Industry is this factor. When the equilibrium between the demand and supply is not maintained, the inevitable result is cut-throat, internal competition for the disposal of the produce of the Industry. The formation of the Indian Sugar Syndicate Ltd, and its recognition by the Governments of U. P. and Bihar cannot check this over-production. Because, this Syndicate is not in a position to regulate the production of sugar throughout India. Moreover, the main function of this organisation is to control the price and selling quota of sugar of the Mills situated in U. P. and Bihar only. What is needed, therefore, is the creation of an All India Body, to be set up by the Government of India, the function of which will be to fix up the production quota of each factory in India. Until this is done, another depression must overtake this Industry from the 1940-41 crop. I have discussed this aspect of the problem in details in a chapter of this volume.

The disposal of molasses, in a profitable manner, is now a menacing problem before this Industry. Of the various means suggested for the utilisation of this by-product, the production of Power Alcohol

has been accepted as the best means for its economic disposal. The Government of India have always turned down the proposal of the Industry to enact the necessary legislation to build up this Alcohol Industry. It is most probable that the recommendations of the Power Alcohol Committee, set up by the Governments of U. P. and Bihar, will not meet with the approval of the Central Government for the protection of some vested interests.

In this volume, I have discussed these problems from the practical experience gained by humble-self by being associated with this Industry for the last 7 years. Authoritative books on Indian Sugar Industry are few save and except the Annuals published by Mr. M. P. Gandhi, an acknowledged authority of all India repute. In writing this volume, I have taken much help from his Annuals for which I am grateful to him. I must also express my sincere thanks to the Secretaries of the Indian Sugar Mills Association and the Indian Sugar Syndicate Ltd, for their prompt replies in supplying me with useful informations from their respective offices. I must also convey my thanks to Mr. Carbery D. Sc. O., M. C., M.A., B. Sc., I. A. S., the present Director of Agriculture, Bengal, for his kind permission in allowing me to use the Libraries of his Department. I am also grateful to my esteemed colleague, Mr. S. C. Paul B. L., who has given me most valuable suggestions in writing out the different chapters of this book.

Above all, I do not find adequate words to express my sincerest gratitude to Sir P. C. Ray who has kindly written the Foreward of this book. In his ripe old age, he has not only taken the trouble of going through this volume but has also obliged me by his most valuable suggestions in writing some of the chapters of this book. I have been simply astonished at the masterly knowledge which he possesses about this Industry. In fact, it is Acharya Ray who has always encouraged me to undertake this stupendous task. It is absolutely sure that I could have never ventured to undertake the writing of this book had I not been always encouraged by his magnetic personality.

The writing of this book was finished long ago but I could not publish it due to a mishap in my family. I am sincerely sorry for this delay which was unavoidable under the circumstances in which I was placed.

I have added three appendices at the end of this book. In appendix A, I have given important figures and statistics with regard to the

Indian Sugar Industry. In appendix B, I have added some tables which will give the readers some valuable informations regarding the position of the Industry in some advanced sugar producing countries. I have also given a synopsis regarding the formation and function of the Imperial Institute of Sugar Technology, Cawnpore, and the Indian Sugar Mills Association, Calcutta. In appendix C, I have given a complete list of important Research works, carried out in the different parts of India, being financed by the grants from the Imperial Council of Agricultural Research, India. I hope that these appendices will be of much help to those who are interested in the development of this Industry in India.

Before concluding this preface, I again express my sincerest regret for the delay in the publication of this volume. I shall consider my labours amply rewarded if this book is appreciated by the different units of the Industry as well as by the general public.

M. N. MITRA.

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SIR P. C. RAY, C.I.E., Ph.D., D.Sc., F.C.S., F.A.S.B.

Different Stages of Development of Indian Sugar Industry.

1912.

Establishment of the Sugarcane Breeding Station at Coimbatore as an experimental measure to study the problems of producing improved varieties of cane suitable for the special sub-tropical conditions of Northern India.

1919.

Appointment of Mr. Wyne Sayer of the Indian Agricultural Service in February, 1919, to compile and collect statistics with regard to the utilisation of sugarcane for the manufacture of white sugar in India.

1920.

Appointment of the Indian Sugar Committee which was, at the outset, presided over by Mr. Mackenna, Agricultural Adviser to the Government of India (now Sir James Mackenna) and later by Mr. Noyce (lately the Hon'ble Sir Frank Noyce). The Committee made a thorough and extensive study of the different problems affecting the growth of Sugar Industry in India and made a number of important and far-reaching recommendations.

Though financial considerations stood on the way of the Central Government to give immediate effect to the recommendations of the Committee, yet after the

publication of this Report, the attention of the various Provincial Agricultural Departments was focussed to undertake sugarcane research very seriously and the Imperial Sugarcane Breeding Station at Coimbatore was made permanent and extended.

The Report of the said Committee, though voluminous, is regarded as one of the most valuable documents regarding the Indian Sugar Industry.

1922-23.

A group of most important seedlings, Co. 205, Co. 213 and Co. 214 were brought into general use for cultivation throughout India. These types, before introduction, were thoroughly tested at different Provincial stations and also at Pussa.

The success of this group was highly encouraging and phenomenal and Co. 213 is now the most extensively grown cane in India.

1929.

Establishment of the Imperial Council of Agricultural Research in June, 1929.

This is a Statutory Body which looks after the agricultural improvements in all its bearing in India. The Sugar Committee of this Council examines the various problems—agricultural and technological—affecting this Industry and make suitable recommendations to the Government of India.

The present Chairman of the Council is :—

The Hon'ble Kunwar Sir Jagadish Prosad,
K. C. S. I., C. I. E., O. B. E.

1930.

Appointment of the First Tariff Board.

The first Tariff Board was appointed by the Central Government in May, 1930.

The personnel of the Board was as follows :—

President—Mr. A. F. Mathias I. C. S.

Members—Dr. John Matthai.

Mr. Fazal Ibrahim Rahimotolla.

(From 2nd. November, 1930)

Mr. R. L. Walker, I. C. S.

(Till 23rd June, 1930)

Secretary—Mr. G. S. Bozman, I. C. S.

(From 24th. June, 1930)

The Tariff Board submitted its Report in 1931 and recommended, amongst others, the following :—

- (1) That the Industry should be protected for 15 years.
- (2) That for the first seven years, the protective duty on all import of sugar, should be levied at Rs. 7/4/- per cwt.
- 3) That for the remaining eight years, the rate of import duty should be fixed at Rs. 6/4/- per cwt.

1932.

Sugar Industry (Protection) Act. 1932.

The Government of India accepted the recommendations of the Tariff Board and the above Act was passed by the Legislatures in 1932. The provisions of the said Act, *inter alia*, state :—

- (i) That a protective duty at Rs. 7/4/- per cwt. shall be imposed upon all classes of sugar, imported into British India, until 31st. of March, 1938.
- (ii) That after 31st. of March, 1938, a further enquiry shall be made to ascertain the nature of protection to be given to the Industry upto 31st. of March 1946,

1934.

The Sugar Cane Act, 1934.

This Act empowers the various Provincial Governments to enforce a minimum price for cane to be paid by the factories to the growers. The object of this enactment is to secure a fair and reasonable price for the agriculturists.

The provisions of this Act have been applied in U. P. and Bihar since the crop season 1934-35. Before the commencement of the season, the Local Governments publish their orders fixing the minimum price of cane on a sliding scale taking a basic of price -/5/- per maund of cane corresponding to an average price of Rs. 8/8/- a maund for No. 1 crystal for factory delivery. The actual minimum prices, to be paid, are notified fortnightly. For Khandsari factories, a lower sliding scale with a basic minimum price of -/3/6 a maund has been prescribed.

The Sugar (Excise Duty) Act, 1934.

This Act—ignoring the opposition by the majority of the elected members of the Assembly and by the Industry—imposed an Excise Duty @ Rs. 1/5/- per cwt. for factory made sugar and -/10/- a cwt. for Khandsari sugar. This Act came into force from 1st. of April 1934.

1937.

Appointment of the Second Tariff Board, 1937.

(i) Terms of reference :—

“To ascertain if protection afforded to the Sugar Industry

by Section 2 of the Sugar Industry (Protection) Act, 1932, should be continued to the same extent or to greater or lesser extent during the period from 31st. March, 1938 to 31st of March, 1946."

Personnel :—

President—Sir Geoffrey Bracken, K. C. I. E., C. S. I., I. C. S.

Members—Mr. F. I. Rohimtolla.

Dr. L. C. Jain.

Secretary—Mr. K. B. Bhatia, I. C. S.

- (ii) Enhancement of Excise Duty from Rs. 1/5/- to Rs. 2/- per cwt. from the 28th. of February, 1937, against the adverse verdict of the Assembly. The Governor-General had to resort to his powers of certification for this enhancement.
- (iii) Announcement by the Central Government in the Budget session of the Legislative Assembly in the year 1937, for the appointment of a Sugar Control Board on the lines of Tea Control Board.
- (iv) The Sugar Committee of the Imperial Council of Agricultural Research in their meeting held in May, 1937, at Simla, decided to recommend to the Government of India to grant free licenses for the production of Power Alcohol from molasses, provided the manufactures pay an Excise Duty of -/10/- per gallon of alcohol produced.
- (v) Establishment of the Imperial Sugar Research Institute at Cawnpore to impart theoretical and practical training in different branches of Sugar Technology.
- (vi) Formation of the Indian Sugar Syndicate Ltd. from July, 1937. The object with which the Syndicate has been formed is to organise an effective marketing of Indian sugar, to eliminate the cut-throat and wasteful internal competition amongst the Indian mill-owners as a baneful result of which Indian sugar

was being sold at about Rs. 3/8/- a maund lower than that of the Java sugar in India.

The Syndicate aims at the stabilization of the Industry by undertaking sales jointly on behalf of the various sugar factories and to spread the sale of sugar over twelve months instead of six months. This procedure will certainly raise the price of sugar both to the interests of the Industry as well as the cultivators. The members of the Syndicate are to conform, mainly, to the following two provisions :—

- (i) Not to exceed the selling quota during any selling period as is prescribed by the Board of Directors.
- (ii) Not to undersell sugar at lower prices than those fixed by the Directorial Board of the Syndicate.

The Syndicate took its auspicious start with 95 factories within its membership.

1938.

1. The most important event of the year is the joint action of the Governments of U. P. and Bihar in enacting the Sugar factories Control Act. The Act, *inter alia*, provides for the following :—

- (i) The licensing of sugar factories.
There will be two forms of license—one for the construction of new factories and extension of the present ones and the other for the crushing of canes. The latter form of license will be granted subject to the certain conditions—one of which is that every factory must be a member of the Indian Sugar Syndicate Limited.

- (ii) The regulation of the supply of sugarcane to the factories.

This has been achieved by adopting the system of zoning which has given to each factory a well-defined zone from which alone it can obtain its cane requirements.

- (iii) The minimum price of cane.

The Act has given a wide latitude to the Provincial Govern-

ments to vary the minimum price of cane and to determine how the minimum price shall be calculated.

- iv) The establishment of a Sugar Control Board and Advisory Committees.

The Sugar Control Board will deal with the major problems of the Industry, e. g. the licensing of factories, fixation of minimum price of cane etc, while the Advisory Committees, will deal with the local problems, e. g. estimates of cane requirements for factories, licensing of Purchasing Agents etc.

- (v) Tax on sugarcane.

The Act provides for the imposition of a tax to the maximum limit of -/-/6 pies a maund on the sale of sugar cane—the proceeds of which will be utilised for the improvement of cane cultivation.

- II. Contrary to the expectations of the Industry and the public, the Report of the Second Tariff Board was not published during February, 1938. As the first stage of protection expired by March, 1938, the Government of India extended the present rate of protective duty upto March, 1939, as a temporary measure.

It is believed in many quarters that the *Report* has not been released for publication by the Central Government as some of its recommendations have not been 'palatable' to them.

- III. The Government of Bihar, in consultation with the Government of the United Provinces set up a Joint Committee in January, 1938, to devise ways and means for starting the manufacture of Power Alcohol from molasses, to report on the best methods of manufacture and mixing Power Alcohol with the Petrol and to explore the possible uses for molasses and other practical application.

The Committee consisted of the following :—

- (1) Mr. Padampat Singhania.

- (2) Mr. M. P. Gandhi.
- (3) Mr. Anantha Subramaniam.
- (4) Dr. S. S. Bhatnagar.
- (5) Dr. N. R. Dhar.
- (6) Mr. G. H. Dickson.
- (7) Mr. P. S. Maker.
- (8) Dr. N. G. Chatterjee.

The said Committee submitted its Report to the Governments of U. P. and Bihar in June, 1938. It is understood that the Committee have recommended the following :—

- (i) That Power Alcohol can be manufactured economically from molasses in U. P. and Bihar which are advantageously situated for such manufacture.
- (ii) That Power Alcohol can be produced at such a cost that an Excise Duty even equal to that on indigenous Petrol can be levied on it.
- (iii) That the Power Alcohol Industry should be established under the control of the Provincial Governments.
- (iv) That a Power Alcohol Advisory Board, representing various interests, should be set up.
- (v) That molasses can also be utilised as a cattle food and fertilisers.

In a very learned note appended with the Report of the said Committee, Mr. Gandhi has sounded a timely warning to the effect that in spite of the clear pronouncement of the Committee, recommending the production of Power Alcohol from molasses, it is doubtful whether the Government of India will view with favour the immediate establishment of the Power Alcohol Industry in view of the attitude of the petroleum interests towards the development of the Power Alcohol Industry in India.

INDIAN SUGAR INDUSTRY

PROBLEMS BEFORE IT

CHAPTER I.

The Past History.

The earliest mention of this crop is found in the mythological works of the Hindus where it has been stated that sugarcane was created by Vishamitra for the 'paradise' of Raja Ikshvaku. When this 'paradise' was destroyed by the demons, sugarcane was allowed to be used by the mortals of this earth.

The mention of sugar, "Sharkra", is also seen in the ancient Sastras of the Hindus where it has been classed as one of the five celestial sweets (Pancha "Amritas"). It will thus be evident that India happens to be the birth place of this important crop. Most recent works go to prove conclusively that the methods of sugarcane cultivation and the manufacture of most forms of sugar were well-known to the Indian cultivators as early as in the 4th century B. C. Ragozin in his famous work "Vedic India" says—"We find no trace of a time when the art of manufacturing molasses and sugar by boiling down and clarifying the saps was unknown in India". It will be quite surprising to note that numerous references and directions for the cultivation of sugarcane, manufacture of sugar from it and various ways of distillation of the liquor have been found by Dr. Shama Sastri in the treatises of Kaotilya's Artha-Sastra said to have been compiled in the 4th century B. C. It will thus be evident that even the

process of producing alcohol from molasses was known to the Indians from the earliest times.

Amongst the Europeans, the troops of Alexander the Great were the first men to see the sugarcane in 327 B.C. By the time of 600 A. D., we find that the Chinese Emperor, Tsai Heng, sent his own men in Bihar in India to study the plantation of sugarcane and its manufacturing process. During this period, what was used was the concentrated juice of sugarcane as sugar. The Industry also expanded in Persia and in other Muhammadan countries. The Industry was very firmly developed in China from the eighth century. Marco Polo and other travellers testified to the evidence of production of sugar, on a large scale, in China in the thirteenth century. The Chinese produced a whiter and cleaner stuff which was brought to India and was called "chini".

Other earlier mention of sugar outside India is stated amongst the spoils captured by the Byzantines at the fall of Dastagard in Persia. The Sugar Industry on the Mediterranean sides was developed by the Arabs who conquered Egypt in 641 A. D. In Spain, the crop was introduced by Abdur Rahaman I in 755 A. D. Here, this Industry reached its greatest expansion in about 1150 A. D. After this, the Industry in Spain was destroyed when the Muhammadans were driven out of Spain by the Christians. By about 827 A.D., this Industry was firmly established in some of the Islands on the Mediterranean.

In 1264, Egyptian sugar was first used by the Royal families in England. In about 1420, the Mediterranean Industry began to decline sharply. The history also tells us that the sugarcane was introduced in America by Columbus in his second voyage there in 1493 when he took it to Hispaniola. The Sugar Industry was developed at Brazil and Hispaniola in about 1600 A. D. In about 1497, Vasco de Gama found a very good market of sugar at Calicut which fact proved conclusively that the Industry was thriving at that time in India very well.

It is also on record that up to the time of Nepolion, Indian Sugar Industry was on firm footing and she used to export it to many of the European countries. Under the inspiration of Nepolion, Beet was discovered in about 1802 and the Beet Sugar Industry was established in Europe by about 1814 which wiped out the Indian Industry practically out of its existence. The first three-roller mill was introduced in 1449 by Pietro and the first horse-driven mill was erected by Velosa in Hispeniolia in 1575. This discovery may be taken as the starting point of modern Sugar Industry in western countries. The first refineries in England were started in 1544 while France came in this field as late as 1700. By about 1688, 50 refineries were working in Great Britain.

The first export of sugar was made by Java in 1637 while the Industry in Cuba was established in 1791 where the white refugees escaped after the slave rebellion in Sento Domingo. The Vacuum Pans were first invented by Howard in 1813 and they were first used by the Java Industry in 1836. The bad system of slavery was abolished in the British Empire in 1834 and as a result of this great economic changes, the Beet Industry was very firmly eablished in Europe.

It has been stated above that India happens to be the original home for sugarcane. We find that the Dutch merchants used to ship the Bengal sugar from Masulipatam as early as 1636 and both white sugar and sugar-candy were being sent out of India from Surat early the seventeenth century and from Calcutta in 1659. We also find it from the report of the Select Committee of the House of Commons on Sugar and Coffee planting that India exported 7,184 tons of sugar to England in 1835-36, 26,913 tons in 1839-40 and her export quota during the period 1839-1847 went as high as 59, 373 tons. It is also on record that during that period, one-third of England's consumption of sugar was met by India. The Benares Sugar, made by the indigenous process, played a very important part in export

trade and this sugar was very largely used for internal consumption. As early as 1866, 'gur' refineries were started in Bengal, specially at Cassipore, and similar concerns were also started in Madras. The sugar produced by this Cossipore factory was regarded to be the best specimen during that time. The development of modern Sugar Industry in India may be traced to the year 1899 when the Govt. of India imposed counter-vailing duties on bounty-fed sugar. As a result of these important tariff changes, modern sugar factories were started in Northern India by about 1903. It will be of further interest to note that as early as 1848, when the said Select Committee Report on Sugar and Coffee planting was published, there existed sugar factories with such familiar names as Mothihari, Bara-Chakia, Belsund, Gorakhpore, Padrauna etc. The Indian Sugar Industry of that period collapsed due to the abolition of preferential duties in 1851.

Modern factories in India were started as late as 1903. From this time and onwards, the Indian Industry, through several stages of fluctuation, moved towards stabilisation without any protection from the Central Government till 1932.

CHAPTER II.

Government's Tariff Policy On The Import of Sugar.

A Brief Review.

Until the memorable year of 1857, the general rate of duty on all foreign imports was 5 per cent, but it was soon increased to 10 per cent due to the sad plight of the finances of the Central Government. This rate was allowed to continue for about 11 years when a mid-way arrangement between the two former rates was made and $7\frac{1}{2}$ per cent was fixed as the general rate of import duty on all foreign goods with a definite 'pledge' that this rate was to be further lowered as soon as the financial conditions of the Government would improve. But like other 'pledges' of the Government, this was not honoured until 1857, when 5 per cent was imposed as the general rate of duty on all foreign imports. The Act XI of 1882 dispensed with all import duties but they were soon re-imposed in 1894 when 5 per cent was again fixed as the rate of tariff on crystallised beet sugar.

At this time, the supply of bounty-fed sugar from Austria and Germany began to create troubles in the Indian sugar market. The problem reached its climax in the year 1897 when the United States Government stopped the inflow of such sugar into their country by imposing countervailing duties upon it. As a result, it was driven to find its place into the far Eastern Countries and Indian market was consequently glutted by this particular kind of sugar. But before the interests of the Indian Sugar Industry were seriously jeopardised, the Government came to the rescue of the Indian capitalists and the year 1899 saw the passage of the Indian Tariff Amendment Act

which authorised the Central Government "to impose an additional duty on sugar imported into India equal to the net amount of bounty or grant paid or bestowed directly or indirectly by the country exporting such sugar". It is needless to say that this wise and timely intervention by the Government saved the Indian sugar manufacturers from utter ruin and collapse.

Finding the Indian market—a huge one indeed—being entirely closed against the import of this bounty-fed sugar, the countries, exporting such sugar, began to look out for fresh and prospective consuming centres. Consequently, the question of this sugar became an international one and the Brussels Convention was conveyed in 1902 to solve this perplexing problem. The principal sugar producing countries attended it and pledged themselves to conform to the following provisions which were laid down by the said Convention :—

- (a) All bounties or grant paid on the production and exportation of sugar would be abolished when the various provisions of this Convention would come into force.
- (b) This Convention would be operating—at the first instance—for a period of 5 years from its date of issue.
- (c) Six and five francs per 100 grms. of refined and raw sugar respectively were fixed as the maximum amount of surtax.
- (d) The sugar—coming from countries outside this Convention—are to be specially taxed and the additional duty would be not less than the amount of bounty.
- (e) The provisions of the Convention were to be put into force from 1st September, 1903.

In order to bring an adjustment between the various provisions of the Brussels Convention on one hand and the

existing laws regulating the import duty on sugar on the other, the Government of India passed the Tariff Amendment Act VII of 1902 which was to remain into force until the 31st. of August, 1903, i. e. until the date of application of the Brussels Convention. But in the long run, the Government of India thought it "wise" enough to break away from the said Convention with the object of "retaining power to levy duties on sugar imported from countries which had not joined the Convention or which having joined it failed to conform strictly to its provisions." With this object in view, the Act XI of 1904, was passed which revived the provisions of the Tariff Amendment Act of 1902.

No material change in the tariff policy on the import of sugar was effected until two years had elapsed since the commencement of the Great War, when in 1916, the duty on all kinds of foreign sugar—except confectionary—was raised from five to ten per cent. The sole reason for this enhancement of the tariff was to meet the deficiency in the central revenues. Protection for the Indian Industry "did not even furnish a subsidiary motive for this imposition." Being pressed for more finances to cope with the post war conditions, the Government of India increased this duty from 10 to 15 per cent. in 1921 which was further raised to 25 per cent in 1922. Three years later i. e. in 1925, a specific rate of Rs. 4/8/- per md. was adopted and this was again increased to Rs. 6/- per md. in March of 1930.

A careful perusal through the short history of the Indian tariff on the import of sugar, as given above, will reveal the unpalatable truth that the considerations which have almost always actuated the Government to make alterations, from time to time, in their tariff policy on sugar imports have been to make up the deficiencies in their central revenues. They have conveniently managed to forget that to help an Industry at its initial stage of development and against foreign competition is one of the primary functions of the State.

But the world-wide economic depression and the consequent further fall in the revenues led our rulers to seriously think as to the best ways of ameliorating the economic conditions of the agricultural population of the country. They soon realised that Sugar Industry, for its very existence, depends upon agriculture, the traditional occupation of a vast majority of Indian people. Moved by these considerations, the Government of India, on May 20th 1930, directed its Tariff Board to make an exhaustive enquiry into the different aspects of the sugar production in India with a particular view to determining to what extent protection should be granted for the healthy growth of this Industry. The Tariff Board released its Report for publication in March, 1931, and recommended the following for the considerations of the Government.

- (a) That a protective duty at the rate of Rs. 6/4/- per-cwt. be levied on all foreign sugars for a period of 15 years and an additional duty of Re. 1/- for the first 7 years.
- (b) That the Government should reserve the power to impose an 'off-setting' duty should the price of imported sugar fall below a stated figure.
- (c) That an annual grant of not less than rupees ten lacs be made for sugar research.

Simultaneous with the publication of this Report, the Government of India, being faced with the difficulty of balancing their Budget, had already increased the duty on sugar which at this time was Rs. 7/4/- per. cwt. on sugar above 23 Dutch Standard. An additional surcharge of 25% was imposed in following September thus bringing the total duty on sugar of the first quality to Rs. 9/- per cwt. Therefore, the duty in force, being already higher than that 'recommended' by the Tariff Board, the Government of India decided to give immediate effect to its recommendations and in February, 1932, introduced the "Sugar Industry Protection Bill" in the Legislative Assembly. The Bill, as passed by both the Houses of the

Legislatures, received the Viceregal assent on the 8th April 1932, and became the law of the land. It followed very closely the recommendations of the Tariff Board except that the proposal for an annual grant of 10 lacs of rupees for research works was rejected on grounds of financial stringency. The Act mainly provided :—

- (a) That the protection would be given to the Industry until the 31st of March, 1946.
 - (b) That a protective duty at the rate of Rs. 7/4/- per cwt. be imposed on all classes of sugar until the 31st of March, 1938, after which, there would be a fresh enquiry to determine what further rate of protection should be afforded.
 - (c) The Government would have power to vary the duty against protection being impaired.
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CHAPTER III.

Sugar Industry In Java.

A Brief Review.

Geographically, Java is smaller than Assam by about 3,000 sq. miles—the area of the former being 50,000 sq. miles and that of the latter 53,000 sq. miles. The population of the place is 3,400 millions, i.e. five times as many inhabitants as in Assam. It is an irony of fate when we learn that though the acreage under cane in India represents half the cane areas of the world and though the per capita consumption of sugar is very low here, being only 22 lbs., yet she had to import about 80 p.c. of her need for sugar from this very Island where the total areas under cane does not exceed 4 lakhs of acres! The reasons which made these strange things into stern facts might be summarized as follows :—

1. Thorough and systematic organisation works which exercise effective control over all the branches of the Sugar Industry in Java.
2. Absolute agricultural control of the lands by the factories through the 'lease system' thereby ensuring continuous supply of the raw materials to the factories.
3. Employment of improved kinds of fertilisers, scientific ways of preparing the fields, excellent irrigation arrangements, selection of the right varieties of cane seedlings etc. which are responsible for the production of a greater yield of cane per bigha than what it is in India.
4. Scientific and expert handling of all the technological problems in the actual manufacturing processes in the factories by an army of trained Chemists and Engineers.

Organisation.

The entire problem of manufacturing sugar in Java—beginning from the preparation of the fields for the cultivation of cane upto the export of the finished products—is controlled by two corporate bodies. One is called the General Syndicate of Sugar Manufacturers in the Netherlands Indies with its headquarters at Soerabia and the other is the Research Station Association with its head offices at Pasoeroean in Eastern Java and Semarang at Western Java. These two organisations are quite non-official in nature and work in conjunction with each other but they widely differ in their functions and character. Almost all the sugar manufacturers of the Island are the members of both of these bodies which are solely financed and maintained by the contributions made by each factory. The amount of this levy is directly proportional to the acreage under cane within the jurisdiction of each factory. Of the two organisations, mentioned above, the General Syndicate is the most important one. It looks after the political and economic interests of all the sugar manufacturers of Java, who are its members, adjusts the relationship between the holders of the lands and the authorities of the factories and serves as a communicating channel between the Government of the Island and the factories over the question of export duty, Railway freight and other important matters vitally affecting the Industry. The constitution of the Syndicate may be briefly stated as follows :—

For affording administrative facilities to the Syndicate as well as to the Research Station Association, Java has territorially been divided into 16 units each of which corresponds to a Commissioner's Division in India. There is a local Board in each of these constituencies whose function is to look after the local interests of the factories within its territorial limit. The President of this Board is invariably the Manager of one of these factories. These sixteen Presidents of these sixteen

local Boards constitute the Council of the Syndicate on one hand and the Council of the Research Station Association on the other. The main body of the Syndicate is, however, divided into three parts :--the Board, the Assembly of Members and the Council of the Syndicate.

The Board is the real executive authority and looks after the wider interests of all the factories lying within the jurisdiction of the sixteen local Boards. Half of the members is nominated by the Council of the Syndicate, the other half by the Assembly of Members which also elects the President of the Board. The President and the members of the Board are all subject to annual election. It is this Board which guides the destiny of all the sugar manufacturers of Java, puts up a great fight with the Government of the Island when it attempts to encroach upon the interests of the Industry and determines the general principles of conducting the business to which all sugar factories strictly adhere to.

The Assembly of members is a general body which meets twice a year for fixing the amount of annual contributions of its constituent members, to pass the audited accounts of the Board and the annual budget. The Council of the Syndicate—although a quite representative body—is purely an Advisory Committee.

Research Station Association.

It is purely a scientific body which attempts to solve the serious problems arising out of the manufacturing works in the different factories and plantations. Besides this, the staff of the Association carry out original research works in the different branches of the Industry and thereby render great help to the factories by supplying them with the results of the experiments. The annual expenditure of the Association amounts to about rupees thirteen to fourteen lacs and like the General Syndicate, it receives its entire financial assistance from the constituent factories. The works of the Association

are mainly directed into three channels—agricultural, chemical and engineering. The headquarters of the Agricultural Department is situated at Pasoeroean and is under the control of a Director, an Assistant Director and a Secretary. Works are carried out in Plant Physiology, Chemical analysis of the soil, Cane Breeding, Bacteriology and such other important matters under the direct supervision of a sectional expert.

The results of the works, carried out at Pasoeroean, are disseminated to the factories through a group of Advisers who all work under the supervision of the Chief of the Field Experiments Section at the headquarters. There were about 20 such Advisers in Java, each of whom held charge of 9 to 10 factories. Besides being a direct communicating link between Pasoeroean, on one hand, and the managers of the factories on the other, he is also entrusted with a very heavy responsibility. He is required to gather all the informations—which must be accurate and comprehensive—regarding the conditions of the climate, soils, varieties of cane etc. of those factories and plantations which have been placed under his control. With the consent of the Manager of a particular factory—lying within his jurisdiction—he carries out experiments on the lands of the factory generally under the following heads ;—

- (a) Trials of new varieties.
- (b) Replacement of Sulphate of Ammonia by phosphatic and other manures.
- (c) Utilisation of the waste products of the factories as fertilisers or otherwise.
- (d) Reduction in the number of cane seedling per acre.
- (e) Best ways of preparing the fields for cultivation etc.

The costs of these experiments are entirely borne out by the authorities of the factory concerned, the only help being received by them from the Association is free service of the Adviser. The results of these experiments are then sent to the

headquarters Station by him where they are very carefully scrutinised by the Experts. The conclusions, arrived at, are embodied in the Periodicals of the Association which are sent free of cost to all the factories for their benefit.

The head offices of chemical and engineering branches of the Association are located at Pasoeroean in Western Java. These two departments are independent of one another and have, as joint administrative Head, the Vice-President of the Research Association. Each Department is being supervised by a Director and a Secretary. The Department of Engineering may be taken to be composed of two sections—General and Electrical. A Consulting Staff, constituted by the eminent experts in all the branches of Engineering, is always maintained at the headquarters. When any factory experiences any difficulty arising out of the engineering sides of the Industry and which goes beyond the control of the factory Engineers ; Pasoeroean is at once communicated with the nature of the trouble. The particular Specialist, out of the Consulting Staff, immediately proceeds to the factory, in question, and sets everything in order. It will, therefore, be evident that the function of this staff is extremely important and it will be no exaggeration to say that the wonderful success which the Java Sugar Industry has now attained is, to a very great extent, due to the most valuable services rendered to the factories by this Department of Engineering. In addition to what has already been referred to above, the Department also engages itself with the original works of the following nature :—

- (a) Best ways of driving the crushing mills by electricity at low rates of consumption.
- (b) Briquetting of “bagasse” and its treatment under pressure.
- (c) The best methods of taking the sample of juice—so on and so forth.

The Department of Chemistry looks after the chemical control of the factories, improvements in clarification process,

prevention of fermentation of the juice during the operation of crushing and milling and other technological problems. A synopsis, giving all the informations of the results of the research works and working of the factories, both on the engineering and chemical sides, is published in fortnightly journals for the mutual benefit of the members of the Association and sent free of cost to the constituent factories.

In the previous pages, an attempt has been made to give a very brief review of the net work of organisations which is responsible, to a very great extent, to make Java to-day as one of those countries that particularly dominates the entire sugar market of the world. The Industry has attained such a high stage of perfection there that sugar of all qualities can be manufactured at such a low cost that they can easily defy any hostile tariff and make their headway to any importing country until their flow is checked by enhancing the duty on them to a very marked degree. However, it is now proposed to deal with the implications of the "lease" system of lands through which the Java factories exercise their absolute control over the cultivated cane areas.

It is an admitted fact that in all the manufacturing works, an uninterrupted supply of raw materials to the factory is a very valuable asset. This is more so in the case of the sugar industry where the cane cannot be imported from a very long distance due to deterioration that takes place during its transit. Moreover, everybody knows that cane is a natural plant and so cannot be obtained throughout the course of a year. On an average, 160-190 days may be taken as the working season of a sugar factory in Java. Therefore, a factory crushing 1000 tons of cane per day has to incur a tremendous loss if it has to suspend its work even for a day due to the shortage of the cane supply.

Inadequate supply of raw materials is one of the most serious handicaps from which every sugar factory of this country suffers. Scarcely there is a factory in India which can work to

its full capacity due to the insufficiency of the cane supply. Java, by introducing the lease system of securing the lands for cultivation, has completely overcome this difficulty and there is no factory on that Island which stops its operation at any time during the working period due to the inadequency of raw materials.

The provisions which regulate the system of leases in Java, are embodied in an Ordinance No. 88 of 1918 of the Netherlands India Government. According to this enactment, no person, who is not a native of Java, can acquire lands in absolute ownership. Consequently, the lands are held under leases for which every factory had to pay a minimum rent to the owner from whom the lease is arranged. This minimum rent depends on the amount of net profits which would result if the land, in question, instead of being used as cane fields, was cultivated for one rice crop and two unirrigated crops during the period for which the land remains under cane. The Government of the Island revises these minimum rates for every five years in the light of the price of rice and other two crops prevalent at the time of revision. A few years back, this minimum rent was at the rate of Rs. 25 to 30 per bigha of land. Besides the payment of this rent for lands, the factory has not to pay anything to the owners—the entire land revenue being paid by the latter. Though the leases are contracted for a longer period, but the factory authorities occupy the lands only for the cane season, i. e. for about 16 to 18 months. As soon as this season is over, the land is returned to the owners in the original conditions in which it was taken possession of by the factory. The provisions of the said Ordinance also enjoin upon each factory not to hold under its lease any land longer than $21\frac{1}{2}$ years. Each factory has to obtain a license from the Government in which the following conditions are clearly defined :—

1. The total areas which the factory is authorised to cultivate for cane per season.

2. The names of the villages over which these areas are to be distributed. But, in no case, the acreage under cane can exceed one-third of the total cultivated areas of any village per one season. The object of this provision is, obviously, to see that sufficient lands are left open for the cultivation of other food crops.

As soon as the legal formalities prior to taking these leases are gone through, all other arrangements regarding the plantation, growth and harvesting of the cane crop are entirely made by the factories at their own cost.

The terms of this license and the contract, entered into between a factory on one hand and the owners of the lands on the other, are very carefully scrutinised and then passed by an officer of the Government equal to the rank of a Collector in India. It will be evident that this licensing system, as now prevalent in Java, has many-fold advantages. Firstly, the competition amongst the existing factories for cane cultivation is not at all possible; secondly, this system affords equal protection to factories and cultivators and thirdly, it prevents more land from being diverted from food crops to cane, thus making the country absolutely independent of its food supply.

It will be apparent from the above discussions that the production of sugar, from the field to the consuming centres, is being carried out in Java under most excellent organisations and on up-to-date scientific lines. In fact, the key-note for the success of this industry in Java is that the plantation of canes, production of sugar and its marketing are being inter-linked with each other and are carried out under the same administration. "In fact, in scientific control of operation of factories, individually and collectively, Java stands second to no country":

Java happens to be the most formidable competitor of the Indian producer. The figures, given below, will prove unmistakably that in the absence of high protective duties, it is impossible for India to stand the Javanese competition.

Details of the cost of sugar per md. in Java.

<i>Items.</i>	<i>Value in Rs. a md.</i>
Cane	1.50
Wages—cutting and transport ...	.46
Cost of manufacture	.27
Packing	.18
Upkeep and repairs	.31
Overhead charges and taxes ...	.52
Carriage of sugar	.18
Selling expenses	.025
Depreciation	.44

Rs. 3.885

i. e. Rs. 3/14/- a md.

Deduct price of Molasses

@ -/5/- a md. -/5/-

Rs. 3/9/-

Freight from Java to

Calcutta. -/3/-

Landing, Port & other

charges in Calcutta. -/3/-

Rs. 3/15/- a md.

This means that, on an average, Java can land her sugar in Calcutta at Rs. 4/- a maund ex-duty.

(First Tariff Board's Report
page 75-76)

Not only that, in his evidence tendered before the First Tariff Board, Noel Deer, an acknowledged authority on sugar, was of opinion that the average factories in Java could deliver sugar in Calcutta at Rs. 4/- a maund. ex-duty, while the best factories could deliver the same in Calcutta at Rs. 2/8/- a maund ex-duty. In sad contrast to these figures, the position of India is rather most miserable ! It is most disappointing to note that most of the factories have to pay over Rs. 3/- a maund only for the cost of canes !

A careful perusal of the following table will also reveal the fact that India will take a long time to attain a position equal to Java in producing white sugar from cane.

Items	Java	India
Tonnage per acre ...	45—46 tons	15—16 tons
Sugar ton per acre ...	6—7 tons	2—3 tons
Extraction percentage ...	14.32%	9.50%
Average annual output per mill	12,500 tons	4,620 tons
Average duration of the crushing season	160-170 days	104 days
Selling charges per md.	4 pies	-1-3 pies

It will be seen from the above that at every stage of this Industry, there is much room for expansion and development in India. Put briefly, the following are the reasons for which Java has now attained such an enviable position in the world sugar market of to-day :—

1. High yield of cane per acre due to improved cultivation of canes carried out under scientifically controlled conditions of manuring, irrigation and improved ways for getting maximum production. The universal practice in Java is to grow exclusively plant cane and ratooning is not done at all.

2. Extremely low cost of manufacture obtained through highest efficiency maintained in every unit of sugar mill.

3. The high percentage extraction of sugar is mainly due to the improved varieties of canes and also for most valuable research works carried out to extract the last trace of juice from canes.

In this connection, it is interesting to note that a sum of Rs.14 lakhs is spent annually at the famous Research Station at Pasoeroean. This fund is realised by imposing a cess on all cane estates at Rs. 3/3/- per acre.

4. The marketing of sugar is done through a selling organisation and this arrangement brings fair selling price to the manufacturers and the charges for brokerage and commission on sale are reduced to a minimum.

The imposition of high protective duty by the Indian

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Govt.—the present rate being Rs. 9/4/ per cwt—has seriously ruined the Javanese Industry. She has lost India as her biggest customer for her sugar and unless the Govt. of India change their policy for protecting this Industry against foreign imports or unless the sugar cane crop in India is destroyed by a catastrophe or damaged by pests, Java can never expect sufficient orders for sugar from Indian merchants any more.

The following table will speak for itself the extent to which the Industry has declined gradually in Java due to the growth of the Indian Industry :—

Year.	No. of Factories.	Cane Acerage.	Cane ton per acre.	Total Production.	Extraction Percentage
1926	178	444,038	42'08	1,958,686	10'38
1927	178	455,806	46'04	2,362,112	11'09
1928	178	481,863	52'53	2,942,769	11'45
1929	179	486,799	49'59	2,895,412	11'82
1930	179	489,984	51'54	2,924,045	11'36
1931	178	493,721	52'70	2,794,022	11'46
1932	166	423,924	53'25	2,571,295	11'16
1933	99	208,947	52'21	1,379,255	12'64
1934	47	96,613	50'01	636,067	12'35
1935	39	68,613	56'65	507,417	13'21
1936	39			455,000	14'32

The above table will furnish us with the following interesting generalizations :—

1. Gradual closing down of the factories from 1932, the year when Indian Sugar Industry was protected by the imposition of high tariffs.

2. Gradual increase in cane tonnage per acre from 42'08 tons per acre in 1926 to over 56 tons per acre in 1935.

3. Wonderful increase in extraction percentage from 10'38% in 1926 to 14'32% in 1936.

It will thus be evident that though the Industry has been very seriously depressed since 1932, the steady progress in the fields and factories has been jealously maintained to the best credit of the Industry.

Indian market being closed to her, Java has now focussed her attention to the markets of China and Japan. She now exports about 75,000 tons to New Zealand and 100,000 tons to Straits Settlement and Siam per annum. But due to the recent increase of import duty in Siam by 100 per cent, it will be difficult for her to retain this good market also. Therefore, it will be apparent that unless Java can find out some other profitable outlet for her export, the Javanese Industry is sure to suffer further set-back in future.

A Few Characteristics.

1. The capacity of the majority of the factories in Java ranges from 1200 to 1500 tons of cane crushing per day of 22 hrs. This higher tonnage reduces the over-head charges to a very great extent and thus lowers down the cost of production.

2. The different organisations, which have made the Sugar Industry in Java as one of the most thoroughly organised industries of its kind in the world, are as follows :—

(a) The General Syndicate of Sugar Manufacturers in the Netherlands Indies—commonly known as the “Sugar Syndicate”.

This organisation was established since 35 years back and it keeps its watchful eye over the different problems embracing the entire Sugar Industry in Java save and except its scientific aspect. The details regarding this Syndicate have already been dealt with.

(b) The Association of the Experiment Station for the Java Sugar Industry commonly known as the “Research Station Association,” functions of which have also been discussed.

(c) The Java Sugar Employers’ Association (J. S. W. B.). —This organisation has been formed in 1920 by the Sugar Producers of Java to counteract the troubles which are generally associated with the employment of labour. It also aims at maintaining equal standard of wages, number of working hours and other conditions of labour in different factories.

(d) The Sugar Union—a corporate body formed by the employees of the Industry. The Union looks after the interests of the labour and other employees of the factories but works in harmony with the Employers' Association.

(e) The Association of Sugar Factory Owners in Netherlands Indies (B. E. N. I. S. O.):—This is composed of all the Directorates of the Sugar Companies which possess sugar estates in Java and its head-quarters is situated in Holland.

This does not exist now but has been converted into the famous organisation of Java, called the NIVAS.

(f) The United Java Sugar Producers (V. S. P.):—This is a central selling organisation consisted of almost all the sugar producers of Java. "It sells the sugar, collects the money and distributes the total receipts among the sugar manufacturers according to the quantity and the quality of sugar delivered by them. The Association is not a profit making enterprise, nor has it any concern with the actual production of sugar or with financing of crops."

(g) Association of Advisers :—This is composed of the experts and technicians of the different branches of the Industry. "They hold periodical meetings and their discussions are recorded in the *Archief voor de Suiker industrie in Ned-Indië*—a valuable periodicle edited by the Research Station Association".

The following table will give us an idea regarding the efficiency obtained by Java in comparison with other principal sugar producing countries of the world.

	Java	Mauritius	Cuba	South Africa
Purity of mixed juice	85'0	93'6	83'8	83'9
Extraction efficiency	93'9	93'6	93'3	88'0
Recovery efficiency	90'5	85'6	91'8	82'7
Over-all efficiency	85'6	76'6	85'6	72'8

Nature of Labour Employed.

(a) The villagers are employed for plantation works.

(b) Chinese hands, under European supervision, are engaged for the Tripples and the Pans.

(c) The wages for the skilled labour vary from -/9/- to Rs. 2/- per day and those of un-skilled from -/7/- to -/8/- a day.

(d) The children of the factory employees can easily get the facilities for training inside the factories.

Administrative Aspect.

The General Manager is the administrative head of a sugar estate in Java. Generally, he draws a salary of over Rs. 10,000 to Rs. 13,000 per annum plus 5 to 8 per cent of the profits of the factory. He must be a person thoroughly experienced in all aspects of the Industry.

We take the liberty of quoting below from Maxwell's Book ("Economic Aspect of Cane Sugar Production"—P. 157), the personnel of a well-recognised sugar factory, commanding cultivation to the extent of 5,000 acres with an annual output of about 25,000 tons of sugar :—

General Manager.

Plantation Management.

- 2 Chief field oversears.
- 9 Field oversears.
- 2 Cane Nursery oversears.

Factory Management.

- 1 Chief Engineer.
- 1 Senior Second Engineer.
- 4 Second Engineers.
- 1 Chief Chemist.
- 4 Chemists.

Transport Management

- 1 Transport Superintendent.
- 2 Cane Harvest oversears.
- 3 Cane Harvest employees.
- 1 Railway oversear.
- 1 Weigh Bridge employee.
- 1 Assistant Weigh Bridge employee.

Office Management.

- 1 Secretary.
- 1 Chief Accountant.
- 3 Assistant Accountants.
- 1 Store-keeper.

In conclusion, it will be of interest to note the high tribute, paid by the Indian Sugar Commission to the well-organised and mechanized Industry of Java, in the following words :- "The commanding position of Java has been secured by an admirable organisation for mutual assistance in all directions, above all in regard to research, generous expenditure on which is recognized to be a most profitable investment, and by the adoption of methods of cultivation and manufacture on which it would be difficult to improve, carried out under highly trained and well paid supervision."

CHAPTER IV.

The Future Of Indian Sugar Industry.

Regulation of Production—A Necessity.

(Being a Memorandum submitted before the Indian
Traiff Board On Sugar Industry).

One of the questions over which controversy has been raised is the introduction of the quota system to regulate the internal production of sugar as one of the means calculated to stabilize the Industry. One section of the opinion, which is advocating to adopt the policy of immediate restriction of production, holds the view that India has now produced more sugar than she requires and so the balance between the demand and supply must be restored. The other school of thought believes that the stage of over-production has not yet been reached but to safeguard against it in future, the system of introducing licenses for new factories should be adopted. Moreover, considerable opposition is likely to come against this quota system from those provinces—e. g. Bengal, Bombay and Madras—where this Industry is still undeveloped on the ground that this policy of internal restriction will arrest the future growth of the Industry in those areas. The owners of a few big mills are also opposing this idea of internal restriction in the expectation that if this system is not adopted, the majority of the middle-sized mills are bound to collapse and at that time they will be able to monopolise the market. Their idea is to live at the cost of those middle-sized factories. They believe that by virtue of their less overhead charges, they will always survive the forces of depression.

1. Is Over-production a Fact ?

Therefore, let us judge the first important point whether Indian production of sugar has surplussed the demand. The following figures will help us a great way in this direction :—

Table I.

Year	Production of sugar (inculding Khandsari & that refined from gur.)	Import of sugar.	Consumption.
	Tons.	Tons.	Tons.
1931-32	4,78,120	5,11,319	10,16,000
1932-33	6,45,283	3,65,707	9,26,000
1933-34	7,15,059	2,49,776	9,32,000
1934-35	7,67,218	2,20,328	10,15,000
1935-36	10,91,700	1,98,888	10,10,000
1936-37	12,29,800	13,979	11,50,000

We can, therefore, arrive at the following generalizations from the above table :—

1. That since the grant of protection, India has made steady progress in producing her sugar with the consequent and gradual fall in import. In 1936-37, she has produced double the amount of sugar than that produced in 1932-33 with the result that the import figure dwindled down to only about 14,000 tons in the said year.

2. That upto 1935-36, there has been no appreciable increase in consumption—the average of which was about ten lakhs of tons per annum. The figure of consumption has shot to 11,50,000 tons in 1936-37 due to extremely cheap price of sugar

3. That on an average, India's consumption of sugar may be roughly estimated at 10,50,000 tons to 11,00,000 tons per annum.

Let us again scrutinise fully the figures of production of

1936-37 season and the carry-over stock of the previous season and its effects upon the sugar market.

Estimated carry-over from 1935-36 season	...	50,000 tons
Production of factory sugar for 1936-37 season	...	1,072,500 ..
Refined from 'gur' in 1936-37 season	..	32,300 ..
Khandshari production for 1936-37 season	...	125,000 ..
Import of foreign sugar	...	14,000 ..
Grand Total		... 1,293,800 ..
Less maximum consumption during the year	... ..	1,175,000 ..
Carry-over for 1937-38 season		1188,00 ..

It will thus be quite evident that the question of over-production is neither a hypothetical one nor a problem of the future, but is a stern fact of the present. There can be, therefore, no dispute over the conclusion that India has produced more sugar than she needs.

This apprehension of over-production was fore-shadowed by Mr. R. C. Srivastava B Sc., Director, Imperial Institute of Sugar Technology, Cawnpore, about two years back and he issued due warnings to that effect in the official publications of Reviews of Sugar Industry in India. The Indian Sugar Mills Association, apprehensive of this danger, addressed the Government of the United Provinces in November, 1936, on this matter and requested them to take suitable action.

II. Effects of Over-Propuction.

It will be admitted by all that the present depression of the Industry is an unprecedented one. The depression has been so severe that the selling price of sugar has practically touched its cost of production. That the supply over demand is more than a truth will be apparent from the fact that inspite of the best efforts of the newly formed Indian Sugar Syndicate

Ltd., the price of Indian sugar (F. O. B. mill delivery) is still barely Rs. 7/- a maund while the quotation for Java sugar is about Rs. 10/- a maund.

The following table will thoroughly be instructive on this point :—

	1935	1936	1937 (upto June).
(Indian 1st. Crystal Special Quality (Cawnpur market)	Rs. 8/13/-	Rs. 7/6/-	Rs. 6/6/-
Imported sugar (Calcutta market)	Rs. 9/13/-	Rs. 9/12/-	Rs. 9/10/-

Had the balance between India's production and consumption been maintained, the price of Indian sugar should have gone to over Rs. 9/- a maund. The reasons for this abnormal low prices for Indian sugar may be summarised as follows :—

1. Over-production.
2. Want of a good marketing organisation through which the sale of sugar, produced in 6 months, can be systematically and gradually pushed all over the year.

We admit that the attempts of the mill-owners to sell this important article of diet, consumable all throughout the year, within a course of six months, are bound to depress the market. We also agree that if the present Indian Sugar Syndicate Ltd. becomes an effective marketing organisation, the price of sugar might be regulated and so elevated to some extent. But this Syndicate or any other sales organisation of this type can never check over-production and its evil effects. Moreover, the works of the Syndicate will be very seriously hampered if the equilibrium between production and consumption is not properly maintained. There will be huge accumulation of stock at the factories and markets and no effort of the Syndicate can induce the mill-owners to clear their stock in gradual instalments. Every body will then naturally be too eager to clear his stock at whatever prices. As a result, the prices will decline very sharply and severe dislocation will overtake the entire industry.

It has been stated above that the present selling price of Indian sugar is, on an average, Rs. 6-6 a md. The manufacturer has to pay Re. 1-8-0 per md. as Excise Duty. Therefore, out of the meagre balance of Rs. 4-14-0, he has to pay for the price of canes, manufacturing expenses, establishment charges, commission for sale, interest on working capital and depreciation. The profit of the mill-owners can now better be imagined! This depression has been brought about by cut-throat, keen internal competition amongst the factories consequent upon over-production. The imposition of the additional Excise, even by resorting to the Powers of Certification, made the position of this Industry worst beyond conception. The Government were of opinion that this additional burden of eight annas a md. would pass on the consumers but this expectation did not materialise for over-production and extra stock. As a result, the major portion of this additional Excise has to be borne by the Industry. It will thus be clear that this additional burden was not shared by the consumers for the reason that production went beyond requirements and there was consequent accumulation of stock in the market. The other serious effect of this over-production was very heavily shared by the cultivators. The price of canes has to be gradually reduced to cope with the unexpected fall in the price of sugar. In U.P. and Behar, where the price of canes is regulated by the Sugar Cane Act of 1934, the Governments of those Provinces had to relax their rules regarding the fixation of prices for canes. The cultivators had to suffer untold miseries. The Governments of these two Provinces were forced to reduce the price of canes from -/4/6 a md. in January of this year to -/3/- a md. in May to the great distress of millions of cultivators. All possible attempts were made by these Governments to induce the factories to continue the crushing operations to consume the standing canes. The Railway freight on cane was reduced by 25 p. c. and fervent appeals were made to the mill-owners to save the growers from inconceivable hardships. The mill-owners did respond to that appeal and continued the crushing even at severe loss.

If this state of affair continues for a longer time and if the cultivators receive such poor return for their cane, the cultivation is bound to be restricted to the great detriment of the Industry.

Therefore, the problem of over-production has not only brought chaos in the sugar market but has wrought havoc to the millions of growers. In giving evidence before this Board, the Representatives of the Behar Government were of opinion that 0-5-6 a md. should be the minimum price of canes delivered at the factory weigh-bridge. In coming to this figure, they calculated that the cost of cultivation of canes was 0-3-6 a md. and 0-1-0 a md. was allowed as transport charges. The profit to the cultivators was, therefore, 0-1-0 per md. Although, the above figures will vary according to the conditions of cultivation and transport of any particular Province or area, we are of opinion that the profit of 0-1-0 a md. to the growers is a fair return. But it is impossible to conceive to pay -5-6 a md. to the growers at the time when sugar is selling at Rs. 6-6-0 or Rs. 5-8-0 a md. The price of sugar must be raised if sufficient relief is to be given not only to the factories but also to the agriculturists. If over-production is diagnosed as the main cause for this depression in sugar trade, this menace must immediately be removed to save the growers for whose relief the protection of this Industry was conceived and enacted. Untold hardships have been cast to the lot of the staff of the factories as a result of this over-production. Being faced with such an un-precedented depression and a feeling of insecurity for future, the mill-owners were forced to maintain a poorly paid staff of Chemists, Technologists etc. only for the season time. Majority of the employees are thrown out of their jobs in off season. This alternate unemployment and re-employment at much reduced wages are bound to disturb the morale of the staff and the logical consequence is the loss of efficiency of the factories. This, in turn, will affect the percentage of recovery thus increasing the cost of production.

III. Causes of Over-Production.

1. The false notion that investment in sugar is always amply lucrative has lured many capitalists to erect a large number of factories, specially in Northern India, even after the imposition of first Excise Duty. Although this Excise put some premium upon the growth of sugar factories, its development was not entirely checked.

2. Over-crowding of factories in Behar and U. P. which is responsible for the production of over 82 p.c. of total production of sugar in India. This over-development of this Industry in these two Provinces is mainly responsible for the present dislocation of sugar trade in India. The total annual consumption of sugar in these two areas is about 3,40,000 tons only while the production is over 9,00,000 tons per annum. This means that production has exceeded the consumption by about 3 times. In the wider interests of the entire Indian Sugar Industry, the Governments of Behar and U. P. ought to have taken prompt and suitable action to avoid this severe congestion of factories in their respective jurisdictions. The other sister Provinces are now to be penalised for the short-sighted policy adopted by the capitalists as well as by the Governments of those two Provinces.

3. As will be evident from a table, given elsewhere, that there has been very little increase in consumption since the grant of protection. This is due to the economic conditions of the people, a large section of which, is accustomed to use 'gur' on grounds of religious susceptibilities.

4. Slow but gradual development of this Industry in some of the Indian States, e. g. Hyderabad, Bhopal, Travancore, etc. where beforelong Indian sugar was very largely consumed.

5. Working of the factories by more than 50 p. c. over the specified capacities.

Had there been no over-crushing, we believe that the problem of over-production would not so seriously depress the Industry at such an early stage.

6. Absence of any outlet for export.

IV. Ways to Combat Over-Production.

It well be agreed that surplus in production can be successfully disposed of or controlled in the following manners :—

1. By increasing the present rate of consumption.
2. By good exporting arrangements.
3. By internal restriction of production.

We admit that though no serious attempt has yet been made by the Industry to increase the consumption by means of propaganda, publicity etc, we are also quite conscious of the fact that no appreciable result can be obtained from this direction. When supply exceeds the demand, immediate attention should be focussed to regulate the production. Half-hearted measures, like publicity etc., can temporarily improve the situation but cannot eradicate the evil for good. Moreover, the following table will convince the Board that per capita consumption of sugar in India lies between 6 to 7 lbs. and that probably the saturation point has already been reached.

Table II.
Per Capita Consumption of Sugar and 'Gur' in India.

(In lbs.)

Year	Sugar.	Gur.	Total.
1931-32	6.2	17.2	23.4
1932-33	5.8	19.2	25.0
1933-34	5.8	21.6	27.4
1934-35	6.2	22.7	28.9
1935-36	6.2	25.1	31.3
1936-37	7.0	27.0	34.0

We can draw the following conclusions from the above figures :—

1. While there has been a slight increase in consumption

of sugar per head by less than 1 lb. only since 1931-32, per capita consumption of 'gur' has been raised by 11 lbs. during the same period. It proves conclusively that, however, cheap might be the price of sugar, a large section of Indian populace mainly rural, will always prefer 'gur' to sugar.

2. That the total per head consumption of sugar and 'gur' in India is 34 lbs. In comparison with this figure, the total average consumption of sugar per head in Europe is 37 lbs only where the average income of an individual is better than that of an Indian. It now follows that even compared with Europe, we cannot expect India's consumption to exceed more than 37 lbs. per head. But any further increase in consumption is likely to raise still further the per capita consumption of 'gur' only.

It has been previously stated that even by computing the consumption figure of sugar in India at 11,75,000 tons per annum at the maximum, there still remains a huge carry-over stock of over 1 lakh of tons for 1937-38 season. It, therefore, becomes an established truth that the maximum limit in India's consumption of sugar has already been reached and that there is not the least scope for increasing this consumption to any further degree by methods of publicity and propaganda.

V. Export Trade.

Much discussion has centred round this important avenue for the disposal India's surplus production of sugar. Practical suggestions have been formulated to give effect to this export idea and it has been held that this outlet promises to be one of the best means to tackle the problem of over-production. Influential commercial bodies, e. g. the Indian Sugar Mills Association, the Federation of Indian Chambers of Commerce, the Indian Sugar Syndicate Ltd., the Bengal National Chambers of Commerce etc. have urged the Government of India to take suitable action to facilitate the export of Indian sugar. Therefore,

this problem of export, specially to the United Kingdom, requires a close examination.

Those who believe in this export trade build their hopes in the following calculations and conjectures. The average annual consumption of sugar in the United Kingdom is about 23,50,000 tons and her net production is about 5,50,000 tons per annum. She, therefore, imports about 18,00,000 tons per annum of which more than $\frac{2}{3}$ rds. are imported from foreign countries and the remaining less than $\frac{1}{3}$ rd. from Colonial sources. As the United Kingdom is enjoying preferential treatment for her textile goods, steel etc. in the Indian market, she should raise no objection in allowing India to supply her with some amount of sugar out of her $\frac{2}{3}$ rds. of foreign import. It has also been argued that this grant of preference to Indian sugar will not only foster the mutual business relation between India and Great Britain but it will also gradually make the United Kingdom independent of her sugar supply from foreign sources. The idea is quite laudable but let us see whether this is feasible.

In view of the fact that the cost of production of sugar in India is comparatively higher than that in other countries which export sugar to the United Kingdom, the advocates of the Indian export trade agree that India may *possibly* compete in the United Kingdom market provided the following conditions are fulfilled :—

1. Total abolition of the import duty on Indian sugar or in the alternative, preferential treatment to be allowed to it as "Certified Colonial" sugar.
2. Considerable reduction in Railway freight from the factories to the ports.
3. Concession in Ocean carriage.
4. Exemption of exported sugar from paying the present Excise Duty.

It should be remembered that the most of the import of sugar in the United Kingdom is 96° polarisation and the rates of import duty are now as follows :—

			(per cwt.)		
			£.	s.	d.
Foreign	...	...	0	8	1·6
Preferential Empire	...	...	0	4	4·8
Preferential Colonial	...	...	0	3	4·8
Certified Colonial	...	...	0	2	4·8

The difference in the rate of import duty between foreign and certified Colonial sugar is 5s. 8·8d. per cwt. If now Indian sugar is given the preferential treatment by admitting it under Certified Colonial, the United Kingdom Government will lose customs revenue to the extent of 5s. 8·8 d. per cwt. of imported Indian sugar. The question of the total abolition of import duty is, therefore, out of consideration. It is idle to expect that the British Exchequer will agree to sustain such a heavy loss in their revenue for the cause of an Indian Industry. Moreover, if Indian sugar is granted the preferential treatment under Certified Colonial Act, it will displace some amount of the present foreign import and will also displace a certain amount of the Colonial sugar now imported into the United Kingdom. We doubt if the British Government will be so kind enough as to help an Indian Industry at the cost of Imperial and Colonial interests. The fact should not be lost sight of that on the recommendations of the United Kingdom Sugar Industry Enquiry Committee, presided over by Mr. Wilfred Green K. C. in 1934, the British Govt. have decided to help the Beet Sugar Industry to stand on its own legs through the grant of subsidy so that Great Britain may be independent of her sugar supply in near future. The British Government have also set a up Sugar Commission to look after the growing of beet, manufacture of sugar from it, marketing, consumption and other problems of the Beet Sugar Industry. The anxiety of the British Government to protect her own home industry will be apparent from the fact that one of the most important conditions, which the Sugar Commission insists to be carried out before the grant of subsidy, is that the factory, applying for such a grant, must not use any

equipment, machinery, plant etc. not wholly manufactured in the United Kingdom without the previous approval of the said Commission. It is, therefore, most unlikely that at a time when Great Britain is developing her own Sugar Industry, she will encourage the Indian import under preferential treatment. This will be testified by a very recent British Official wireless message of September 23rd. of this year to the effect that the National Union of Manufacturers of Great Britain have sent a Memorandum to the British Government expressing their anxiety lest the Government should be prepared to modify the system of Imperial preference at present obtaining in the United Kingdom.

It will thus be manifest that until there has been a substantial decrease in the cost of production of sugar, India cannot expect to take advantage of the possibilities of export. As the cost of production is invariably connected with the quality of cane and as the present quality of Indian cane is far from being satisfactory, it will take several years more before India can reduce her cost of production and can expect to export her sugar in the United Kingdom. This high cost of production cannot be counter-balanced by granting the preferential treatment to Indian sugar and by reducing the freight from factories to the United Kingdom ports. This difficulty has also been admitted by the Indian Sugar Mills Association and also by the Government of India. In reply to a question in the Legislative Assembly on the 30th of March, 1937, the Government of India stated that until India could produce sugar at cheap rates, the possibility of export cannot arise at all. It should also be considered that the reduction of Railway and Ocean freights on Indian sugar and abolition of Excise Duty on exported sugar means a considerable loss of revenue to the Government of India and the Railway and Steam-ship Companies. So, it seems that the Government of India as well as the British Government will sustain loss in revenue if India is allowed to export sugar on the satisfaction of the above conditions. Knowing the intentions of the Government of India as were evident in the enhancement

of sugar Excise Duty even by resorting to the powers of Certification, we do believe that the loss of revenue is the last thing which the Government will tolerate to stabilize this Industry. Moreover, it has been stated previously that Great Britain imports mostly raw sugar of 96° polarisation or white, crystalline sugar of extra superior quality. We should, therefore, judge whether the Indian factories, as at present equipped, can manufacture either of the above quality with profit. We should also remember that the fulfilment of so many "ifs" will take a long time and it will not be wise and practical to depend on so many problematical factors for the stabilisation of this Industry.

Moreover, the question of Indian export has been decided against her by the last International Sugar Conference in London. This decision is most regrettable in view of the fact that no Representative of the Indian Sugar Industry was permitted to be present at the said Conference. It clearly demonstrates the indifferent and callous attitude of the Government towards the united demand of the Industry to accept a delegation on its behalf. The first press message received in India regarding this Conference in London was on the 5th of February, 1937. With praiseworthy promptitude, the Indian Sugar Mills Association addressed a letter dated the 10th of February, 1937, to the Government of India and pressed them for the inclusion of Representatives of the Industry in the Indian official Delegation to the Conference. But the Government were surprisingly silent on this important demand of the Association although a reminder was sent to them on the 4th of March, 1937. At last, an interpellation, put in the Legislative Assembly on the 12th of March, 1937, elicited the valuable information from the Hon'ble the Commerce Member that India's interest at the Sugar Conference would be represented by Sir David Meek, Indian Trade Commissioner in London as the sole Delegate with Mr. Noel Deer as the Technical Adviser. But these two gentlemen are, in no way, connected with any representative organization of the

Indian Sugar Industry. It will be thus seen that although timely approach was made to the Government to include Representatives of the Industry in the Delegation, they, from the very beginning, were not in favour of letting the real "Voice" of Industrial India heard at the said Conference.

The Article in the International Sugar Agreement which relates to India runs as follows :—

- (a) "The Government of India undertake to prohibit exports of sugar by sea elsewhere than to Burma during the period of the present Agreement.
- (b) In the event of re-export of Indian sugar by sea from Burma rendering the Government of India's contribution to the present Agreement ineffective, the Government of India will take up the matter with the Government of Burma with a view to reaching arrangements which will render the Government of India's contribution effective."

It will be thus seen that this important decision to deny India the right of export has been extremely deplorable, specially, at the time when the possibilities of Indian export are being freely discussed. Under the terms of the said Agreement, the contracting Governments shall have to ratify their respective commitments and we believe that the Indian Legislature will refuse to ratify the said undertaking made on behalf of India without their previous approval.

However, we are of opinion that even if India was allowed to export to the world market, the high cost of production of our sugar would have stood on her way. We are of definite opinion that under the present circumstances, export to the United Kingdom market is not feasible and it cannot, therefore, solve the problem of over-production of sugar.

VI. Internal Restriction.

It will thus be seen that the regulation of production is the only means by which the surplus in production can be

tackled. We are of opinion that the fixation of quota system is bound to stabilize this Industry once for all. The restriction on production will immediately balance the scale between demand and supply and it will raise the sugar market to the relief of the mill-owners as well as of the cultivators. The Indian Sugar Mills Association at the Fourth Annual General Meeting held in August, 1936, fully discussed this problem and passed the following Resolution :—

‘In view of the prospects of over-production of factory and khandsari sugar in the near future, this Association is of opinion that some measures of control should be put on the erection of new factories and on the extension of the existing ones.’

It will thus be manifest that the Association favours the idea of controlling the production. If this proposal of licensing the new factories and the extension of the present ones is accepted, it means the introduction of the quota system on the basis of production of sugar for 1936-37 season. The said Resolution of the Association indicates that in their opinion, the problem of over-production has not yet reached but will present itself in future, if premium is not put on the erection of new factories and the extension of the old ones. But we do believe that India has already produced more sugar than she needs and therefore, the figures of production of 1936-37 season should not be taken as the basis for fixing the quota. We strongly advocate the view that the maximum annual consumption for India will never exceed 10,50,000 tons and the distribution of quota should be made on this basis. We understand that the All India Sugar Merchants' Association of Bombay have supported our views and favoured the idea of fixing quota for sugar manufactured by the factories. They have also suggested that the licenses for the new factories are essential and that no license is to be granted for any factory in U. P. and Behar. They have also supported our contention not to allow any extension to the present factories. It has been argued that this regulation of

production may not be practicable for the difficulty in exercising control over the quota system of the factories all over India. But it is absolutely a wrong idea. The production of sugar is being controlled by the Governments in almost all advanced sugar producing countries. The regulation of production is being successfully followed even in Great Britain. In the last International Sugar Conference held in London, the United Kingdom Government have agreed to limit her annual production of sugar approximately to 6,18,000 metric tons raw value during the continuancy of the Agreement, i. e. for 5 years from the 1st of September, 1937. The production of sugar in the Union of South Africa is being controlled by the Sugar-cane Act of 1936, and hence the balance between production and consumption is always maintained.

We do not, therefore, see any reason why the regulation of Indian production cannot be successfully controlled. This authority of controlling the production should be vested with an All India Body to be created under statutory authority. Another argument which has been levied against this quota system is that the Government of India will not interfere with the production of a private industry as they did not do in the case of Jute industry. But, it seems unlikely that the Government will stand on the way of controlling this production of sugar as they did so in the case of Tea industry when it had been severely depressed for over-production. The Government of India have not yet taken any decision on this point as will be evident from the reply given to a question put in the Legislative Assembly on the 30th March, 1937, enquiring whether the Government have considered the desirability of controlling the production of Indian sugar. Sir Girija Sankar Bajpai remarked that the terms of the present Tariff Board were fairly wide enough to consider this question. It will thus be clear that the mind of the Government is still open and that they are anxiously awaiting the Report of the Tariff Board.

It will not be out of place if we revert again on the

subject of export. In moving for the ratification of the London Agreement, so far India is concerned, in the Legislative Assembly on the 27th of September, 1937, the Hon'ble the Commerce Member to the Government of India stated in unequivocal terms the considerate opinion of the Government regarding export, as follows :—

“The truth is that the gap between the cost of production in India and that of the great exporting countries like Java and Cuba is still so wide that there is no possibility of India exporting sugar on a purely economic basis unless severe measure of cartelisation or Government control is enforced. The cost of production in India may, of course, be further reduced, but it is still so high that India cannot place her sugar to-day on the world market at a price less than 50 per cent above that which foreign producers can do so. I am quite prepared to believe that considerable advances may yet be made in the productivity of the crop and improvements in organisation and in technical equipment which will tend to reduce it. I am less hopeful about other expedients such as large reduction in Railways and Ocean freights which have also been suggested in certain quarters. But it must be obvious to all that there are also powerful influences which tend to work in the other direction, some of them working in India, and other, less amenable to our control, in the world at large.”

Similar opinion of Government was also expressed by the Hon'ble Sir Zafrullah Khan in reply to a question put in the Legislative Assembly on the 30th of March, 1937 :—

“In India, the cost of production is considerable higher than in other great sugar producing countries of the world and that no great reduction

in such cost is possible until the quality of Indian sugar cane has been further improved and the cost of its production reduced, a process, that must take several years. In the meantime, Government do not think it would be feasible for Indian sugar to compete in the export market."

It will thus be abundantly clear to the supporters of the export trade that the Government of India are of definite opinion that under the present circumstances and unless India can improve much in lowering down the cost of production of sugar, export to the world market even to the United Kingdom is not a practicable proposition. Therefore, we again repeat it here that the question of surplus production of Indian sugar cannot be solved through this outlet of export.

Arguments have been advanced against the internal regulation of production on the ground that under any scheme of restriction, it is difficult to exercise control over the Indian States where this Industry is now gradually developing. But, in our opinion, this question has been given an undue importance. Because during the last five years, three or four Indian States, in the whole of India, are trying to develop this Industry in their respective jurisdictions. The total number of factories now operating in the Indian States is only eight and the total production of sugar on this account is about 72,000 tons only. We must remember that the conditions for the development of this Industry are not propitious in every Indian State. Moreover, we do sincerely believe that if the political questions like Federation etc., which are more complex in nature, can be successfully negotiated with the Indian States on mutual adjustment, there is no reason why this economic question, affecting an Industry, cannot be solved with mutual consent and under the benign influence of the Government of India.

VII. Position of Un-developed Provinces Under Restriction Scheme.

It has been seriously questioned that if the production is restricted and the system of licensing of factories is introduced, this will immediately arrest the growth of this Industry in those Provinces where it has not yet been developed. The Bengal National Chambers of Commerce, in their Memorandum submitted before this Board, have opposed this idea of regulation on the above ground but at the same time they have not been able to produce a practical scheme to combat the present depression and to raise the price of sugar. We are constrained to remark that the narrow ideas of provincialism have been introduced when the question of stabilizing an All India Industry is engaging our serious attention. The market of sugar is determined not on the provincial demand and supply but on the basis of All India requirements. Therefore, the measures of stabilization should be judged for the wider interests of India and not for any particular Province. If the Provinces, where this Industry have not yet been developed are allowed to produce sugar until they become independent of their sugar supply, the production will far exceed the demand beyond conception and the entire Industry is bound to collapse. The following tables will be of much interest to judge this position.

Table III.
(For the Crop Season 1936-37)

Province	No. of Mills working.	Production of sugar. (Tons)	Percentage of total production in India.
United Provinces	71	5,05,000	52'7
Bihar & Orissa	36	3,19,000	29'8
Punjab	6	13,900	1'3
Madras	10	22,600	2'1
Bombay	6	37,700	3'5
Bengal	6	23,600	2'3
Burma	3	18,000	1'5
Indian States	8	71,800	6'7
Total	146	10,72,500	100,00

Table IV.

Figures of Consumption.
(For 1936-37 Season)

Province	Consumption (estimated)
United Province	1,90,000 Tons.
Bihar & Orissa	1,50,000 "
Punjab, States & Kashmir ...	1,00,000 "
Madras, States & Hyderabad ...	2,00,060 "
Bombay, States, W. I. States & Mysore	1,25,000 "
Burma	40,000 "
Bengal	1,50,000 "
Assam, C. P., N. W. F. P., & C. I. States, etc. ...	1,95,000 "
Total for India ...	11,50,000 Tons.

We can now arrive at the following generalizations from the above figures :—

1. In 1936-37 season, India has produced 10,72,500 tons of sugar direct from cane. To this are to be added 32,300 tons of sugar refined from *gur* and 1,25,000 tons of *khandsari* sugar. The total output of sugar of all kinds in 1936-37 is, therefore, 12,29,800 tons.

2. Over 82 p. c. of the total requirements of India are produced by U. P. and Bihar.

3. The production of sugar in Punjab, Madras, Bombay and Bengal is much less than that consumed by these respective provinces.

4. The total consumption of sugar in the whole of India including the Indian States is 11,50,000 tons per annum.

Since that grant of protection, there has been very little increase in the number of factories in the Provinces, e. g. Punjab, Madras, Bombay and Bengal.

The position of this Industry, at the present time, in the above un-developed Provinces is not due to the fault of U. P. and Bihar, but entirely due to the shyness of the capitalists of those areas who failed to take advantage of the benefits of protection. The capitalists of U. P. & Bihar were foremost in investing their money in sugar and so we should not grudge if they now enjoy the fruits of their investment. Had this Industry been developed, to the same extent as in U. P. & Bihar, in the un-developed Provinces, the position of this Industry would have then been reviewed much earlier by the competent authorities. Moreover, we must not forget that the conditions for the development of this Industry are much more favourable in U. P. & Bihar than those in the un-developed Provinces. Inter-Provincial jealousies should not make us blind in stabilizing an Industry with which the interests of millions of agriculturists are indissolubly associated. We should also remember that it is highly improbable that at the present stage of this Industry, the capitalists of these Provinces would venture to invest any money for new factories. Consequently, the production figures of these areas are not likely to undergo any appreciable increase in future.

But at the same time, we are fully alive to the fact that under any scheme of restriction, some scope must be left for the expansion of this Industry in un-developed areas. We suggest that some sort of marginal quota should be allotted to these Provinces thus allowing for future development. Let us take the case of Bengal. Her present production and consumption is 23,600 tons and 1,50,000 tons respectively. Therefore, the marginal quota for her should be fixed at about 50,000 tons so that there remains a scope for the erection of 3 to 4 new factories each having a capacity of 500/600 tons. Similar marginal quotas can also be fixed for other non-developed Provinces. Therefore, for any effective scheme for regulating the production, our suggestions are as follows :—

1. That the maximum consumption of sugar for India

including the Indian States should be calculated at 11,50,000 tons per annum.

2. That the distribution of quota to the different factories should be made on the above basis of total consumption.

3. That marginal quotas, as stated above, should be allotted to non-developed Provinces. The basis of this marginal quota should be judged not only on the figures of consumption of the Province but also upon the following factors :—

- (a) Extent of growth of the Industry since the grant of protection. This will serve as a fair index as to the amount of capital that is likely to be invested on sugar in future.
- (b) The other conditions governing the erection of new factories.
- (c) The position of the cultivation of cane.
- (d) The transport problems for conveying canes from the fields to the factories.

4. That the sum total of these marginal quotas, fixed in excess of the present consumption in each of the un-developed Provinces, should be secured by curtailing the figures of production of the factories in U. P. & Bihar. This can be easily achieved if each of the factories there is directed to limit its production to a stated capacity and is not allowed to indulge in over-crushing.

5. That the licenses are to be obtained for the erection of new factories and extensions of the present ones.

6. That no license is to be granted for a new factory in U. P. & Bihar and no extension of the present capacity of any factory there is to be allowed.

7. That the authority for controlling this quota system is to be vested in an All India Body to be created by a Statute.

8. That the quota system for the whole of India is to be reviewed after every five years while the marginal quotas of the non-developed Provinces are to be revised annually in the light of the circumstances prevailing at that time.

9. That in fixing the quota for each factory, the original and present capacity of the plant is to be taken into consideration.

10. That the functions of the said All India Body can be regulated more or less on lines of the South African Sugar-Cane Act of 1936.

VIII. Conclusion.

We beg to urge upon the Board to remember the fact that the most serious problem which now confronts this Industry is severe depression due to the fall in the price of sugar beyond all expectations. It cannot be denied that India's production of sugar has exceeded the demand and her total consumption cannot go beyond $11\frac{1}{2}$ lakhs of tons per annum. This distressing position cannot be improved unless the production is fully controlled by the Government. We welcome the formation of the Indian Sugar Syndicate Limited but it must be remembered that it cannot exercise any control, whatsoever, to regulate the production. Moreover, the objects of the Syndicate to control the market are bound to be frustrated if there be supply over the demand. It has been suggested that the abolition of excise at least, the additional burden of about 8 as. a md., will relieve the Industry of its present depression. While admitting that this may give some relief to the mill-owners, we are of opinion that this step will not consolidate and stabilize the Industry. It is extremely doubtful whether the Government of India will agree to part with their income derived from excise. It has also been argued that India has produced more sugar beyond her need only in 1936-37 season per chance, and that the production, in subsequent seasons, will not go so high. It may be that due to the contraction of cultivation of cane—as a result of the poor return which the cultivators received in 1936-37 season—India's production of sugar might not be so huge in 1937-38 season. But this should not be considered as an argument against the

regulation of production. We must remember that the factors leading to over-production are there and so suitable steps should be taken immediately to guard against future so that another depression may not overtake the Industry in future.

The principle of regulating the production of sugar has been accepted by the last International Sugar Conference in London—the main object of which was to regulate the demand and supply of world sugar. We, therefore, believe that the Government of India will not hesitate to frame suitable legislation to control the internal production if that measure is recommended by this Board. We do strongly believe that once the equilibrium between demand and supply is restored, the price of Indian sugar will go up to Rs. 9/- a md. during the period of protection and the Industry may then be in a position to pay the excise to the extent of Re. 1 a maund only. The Government of India may not then be faced with the problem of the abolition of entire excise duty at a great loss of revenue.

30. 9. 37.

CHAPTER V.

Utilisation of Molasses in India.

Production of Power Alcohol.

The Sugar Industry Protection Act of 1932 is a land mark in the annals of the industrial developments of this country. Sugar Industry in India received its impetus since the grant of this protective measure. The extent of expansion of this Industry in India will be judged from the fact that before the imposition of this prohibitive duty, the total number of mills (including the 'gur' refineries) was a little over three dozen but the number has now increased to over hundred and fifty. This rapid strides in the expansion of this Industry is undoubtedly re-assuring but the Indian sugar manufacturers should be reminded of the fact that they must not allow this Industry to fall back on its evil days when the present form of protection is lifted. They should further remember that the mere balancing of country's consumption must not be their only objective. Indian sugar must be manufactured at such a cheap rate that they can easily capture the markets beyond the limits of the Indian Ocean. The question now arises—what steps are to be taken to stabilize this Industry on a permanent footing ?

One of the ways for achieving this object is the proper utilisation of molasses. Disposal of this waste product, in a profitable way, has now become a stumbling block to the full growth of the Indian Sugar Industry. When the first Tariff Board on Sugar Industry was appointed by the Government of India, it recommended the present degree of protection (Rs. 7-4 per cwt.) by assuming for molasses a price of Re. 1-8 per md.

This was six years back. Since then, there has been an unexpected increase in its production due to the establishment of a number of sugar mills within a very short period. As a result, the price of it has undergone a fall beyond all calculations. It can not now fetch a price of even 2 as. only a maund. Referring to this matter, Sir P. C. Roy in the course of laying the 'Foundation Stone' of a sugar mill in Bengal remarked, "Nay not even that, the position has become so grave that there are factories which will gladly agree to dispose of their molasses, free of cost, if some agency comes forward to remove it. In the past, it was utilised as a 'curing material' in the tobacco Industry and in the production of country spirits. But, its consumption in both of these directions has fallen to a considerable extent. Therefore, until and unless some new avenues are explored for the economic disposal of this product, Indian manufacturers cannot be expected to lower down their cost of production of sugar to any appreciable degree."

The enormous increase in the production of molasses in India will be evident from the following figures.

Year.		Production of Molasses.	Price per maund.
1931-32	...	365,000 tons	Re. 1/8/-
1932-33	...	401,000 „	-/6/-
1933-34	...	430,000 „	-/2/-
1934-35	...	406,000 „	Practically no price.
1935-36	..	494,000 „	„ „ „

Sources of Utilisation.

Generally, the profitable utilisation of molasses can be effected in the following ways :—

1. Production of Power Alcohol and Methylated Spirit.
2. As a Fertilizer.
3. As a Cattle food.

4. As a Road Surfacers.

5. Production of Acetic Acid and other Acetates.

But the most economic way, in which it can be easily disposed of, is the manufacture of Power Alcohol from it. This when mixed with petrol in the ratio of 3 to 1, finds a very good use as a substitute for motor fuel.

A Short History.

The term, 'Power Alcohol' is generally used to denote ethyl alcohol that is to be used for generating 'power' in internal combustion engines. Very little success was obtained, until 1897, for utilising 'spirit' for the production of locomotive power. Ringelmann was, amongst the others, the first scientist who studied the feasibility of the spirit as a fuel and made an extensive series of investigations at the Experimental Mechanical Laboratory at Paris. In October of 1900, an important competition, for establishing motor speed on a course of 76 miles, was held in France. Sixty seven motor cars competed and out of which thirty five finished the course. The fuel consisted of alcohol with 25-60% of petrol and in a few cases, alcohol alone. In 1909, further trial took place on a course of 167 miles. The results indicated that 1'28 gallons of alcohol gave same result as 1 gallon of petrol. It was then concluded that without any change in the composition of the engine—1 gallon of alcohol can be a good substitute for 0'83 gallon of petrol. Experiments, in this direction, were also carried out by the London General Omnibus Company. The Asiatic Petroleum Company requisitioned the services of Richardo, Tinard and Pye who conducted exhaustive research works into the problem of producing alcohol from molasses. The potential value of alcohol, as a good petrol substitute, was then recognised and many national efforts—aiming at the establishment of power alcohol industries—were made in the different parts of Europe.

Position of the Industry in different Western Countries.

Great Britain :—In Great Britain, an Inter-departmental Committee was set up during the war period to report on various matters affecting the production and utilisation of alcohol for power purposes. The entire question was then further investigated by the British Fuel Research Board which had issued several valuable memoranda on the subject. The British Power Alcohol Association had been formed to explore the possible avenues for manufacturing power alcohol from molasses. A few years back, the amount of industrial alcohol, produced in the United Kingdom, was about 5 million gallons.

France :—Vigorous but systematic attempts have been made here to place the problem of producing industrial alcohol from molasses on a more sound basis. The establishment of an 'Office National Des Combustibles Liquids' had been one of the actions taken in that direction. The function of this body is to make a thorough and scientific study of all the aspects of the French Liquid Fuel Problem. Legislations have been enacted by the Government enforcing all French Importers of petrol to purchase an amount of alcohol equivalent to 10% of their total imports. France produces about 1,000,000 hecto-liters (about 22,000,000 gallons) of rectified spirit per annum and almost all of it have been produced from molasses.

Germany :—Though she has paid much more attention to the problem of producing liquid fuels from various solid materials by hydrogenation, low temperature carbonization and catalysis etc., yet she has done and is doing much for producing industrial alcohol from molasses. During the war period and afterwards, a 'National fuel' or "Reichskraft-stoff" consisting of about equal parts of alcohol, benzol and tetraline, has been introduced. The Reichstag have in 1930, passed a law requir-

ing that all petrol importers must purchase a certain amount of alcohol and mix it with their imported petrol.

Spain :—To give an impetus for the development of the Power Alcohol Industry, the Spanish Government decreed that all importers of gasoline and petrol should mix 4 p. c. of alcohol that has been produced in Spain from molasses with the imported product. Similar enactments have also been made in Czechoslovakia, Hungary and other Continental countries.

In Cuba, at the present time, nearly 5,000,000 gallons of Power Alcohol are annually produced. The Philipines used the Foster Patent mixture (Alcohol 55 p. c., Ether 42 p. c., Kerosine 2 p. c., Pyridine 0.5 p. c.) as a good petrol substitute. In Hawaii, the production of Alcohol from molasses is estimated to be about 10 million gallons. In the Commonwealth of Australia, out of 62,500 tons of molasses, 15,000 tons of it are utilized to produce about 9,80,000 gallons of methylated spirit. The remaining 47,5000 tons are partly used for fuel and partly as a cattle food.

In Argentina Republic, out of 41 sugar mills, 26 operate in alcohol distillation. The total production of Power Alcohol in 1929 was 21,044,437 litres. It has found that a ton of molasses produces about 230 litres of alcohol.

Advantages for using it as a petrol substitute.

The reasons for which Power Alcohol has found such an extensive use as a more desirable and possibly a more economical fuel than petrol are that in addition to the advantage of possessing higher thermal efficiency, it possess the following special advantages :—

- (1) Smoother running.
- (2) Absence of unpleasant exhaust.
- (3) Absence of carbonization.

(4). Greater safety from fire due to miscibility with water which results in cheaper insurance cost and save handling.

The superiority of the admixture of Alcohol-Petrol over Petrol, as a substitute for motor fuel, will be further evident from the following extract from "Power Alcohol in its Present State" by Charles Schweitzer, Niort, 1935 :—

"The idea of using alcohol as fuel originated about thirty years ago. Several countries, however, particularly Germany, Sweden and Poland, took up the study of this problem from the beginning and founded specially organized institutions which were to examine the question methodically and scientifically. The experiments effected by these organisations in the course of several years proved conclusively the superiority of mixtures containing from 70 per cent to 80 per cent standard gasoline and from 20 to 30 per cent absolute alcohol. The advantages of these mixtures were such, that since 1928, i. e., before any legal application, Germany already used about 25,500 gallons of "Monopolin" (fuel, containing 20 per cent absolute alcohol) per annum. In Sweden, where no special legislation exists to this effect, the "Lattbenty" (75 per cent. petrol and 25 per cent absolute alcohol) is being almost exclusively used, it replaced the "Esso" superfuel, containing petrol and benzol, and the users are willing to pay 1 or 2 ores more per gallon than for pure petrol. In Natal, where the sale of the "New Union Motor Spirit" (25 per cent petrol plus 50 per cent absolute alcohol) is free, the consumption of this fuel during the first month reached 8,000 gallons and during the second 12,000 gallons, so that at the present moment, production had to be trebled in order to meet the demand. In Australia, "Shellkol" a mixture containing 15 per cent alcohol enjoys similar success. Many other countries now introduce the use of alcohol as a

motor fuel by official regulations, particularly Poland, Hungary, Latvia, Czecho-slovakia, Italy, Brazil, Chile, Argentine, Panama. Malaya States, etc. etc."

Besides, judged from the national aspect of view, the following advantages should also be considered :-

- (a) The reduction of drainage of money from the country for importing petrol.
- (b) The desirability of having a national product as substitute for petrol.
- (c) The necessity of having a plentiful supply of alcohol--an important munition.
- (d) The beneficent effect on the cultivator of such an Industry.

"Besides, the part which power alcohol would play in the national economy of India, would be of as great an importance as it has been in other countries of the world. At the present time, India consumes annually about 90 million gallons of petrol, the average C. I. F. price of which is about five annas per gallon. Thus our expenditure on petrol comes to about Rs. 2, 80, 00, 000 per year. This amount could be substantially reduced if alcohol is produced in the country and mixed with petrol."

(Indian Sugar Industry Annual—1937
By M. P. Gandhi, p—104-5 and 110).

Government's Interest.

From what has been stated above, it is abundantly clear that the production of alcohol from molasses for the purpose of generating 'power', is now an accomplished fact and has consequently been accepted as one of the important national industries by the principal European Countries. There is then no reason why the Government of India will not take a sympathetic view of this aspect of the Sugar Industry in India. The only argument,

which will probably be advanced by the Government for not reviewing the present excise regulations and thereby rendering the production of alcohol from molasses easy is the fear that their import duty might undergo a fall due to the decrease in import of petrol if it is substituted by alcohol produced from molasses.

Let us now examine this problem of the Govt. in some details to find out the exact extent of their loss in revenue due to the fall in the petrol imports.

Consumption of petrol in India from the year, 1926-1932.

Year.		Petrol (in million gallons)
1926-1927	...	36'3
1927-1928	...	48'6
1928-1929	...	61'2
1929-1930	...	79'2
1930-1931	...	79'4
1931-1932	...	75'5
1932-1933	...	69'5

Out of this, the following quantity of petrol—including benzine and benzol—was imported into British India by sea during the said corresponding years.

Year.	Quantity (gallons)
1927-1928	137,899
1928-1929	168,094
1929-1930	4,654,619
1930-1931	8,836,361
1931-1932	12,741,576
1932-1933	5,116,733

Average—5,275,880

It is then evident that, on an average, India imports over 5, 200, 000 gallons of petrol per annum. The present import duty on petrol is -10- annas per gallon. That is, the total amount of custom duty realised by the Government from this import is over Rs. 32 lakhs.

On rough calculations and on an average, the production of molasses in India can be roughly estimated at 5, 00, 000 tons per annum. It has been proved conclusively that under normal conditions of manufacture, 1 ton of molasses will yield 65 gallons of 95 p.c. alcohol ("Power Alcohol—Proposals for its Production and Utilization in Australia"—Bulletin 20). On this basis, the total amount of alcohol which may be produced from Indian molasses is 32,500,000 gallons. Taken for granted, if this entire quantity of alcohol is utilised for admixture with petrol; the Government are expected to sustain appreciable loss in their customs revenue due to the fall of import of petrol.

But if the Government really relax the present laws regulating 'denaturation' and thus afford an opportunity of developing the 'Alcohol Industry'; the above loss can be counterbalanced, though not fully, from the following sources :—

(1) The income tax which will be assessed upon the new Distilleries that will gradually come into existence.

(2) The customs duty which will be realised from the import duty on distilling plants.

(3) A small amount of excise duty might be levied per gallon of alcohol manufactured in India.

Duty of the Government.

1. To institute a Committee—consisting of officials and non-official as well—to enquire into the possibilities of producing Alcohol from Indian molasses. Very recently, the Governments of U. P. and Bihar have appointed a Special Committee to investigate this problem.

2. The Government should immediately relax the regulations regarding 'de-naturation' so that experiments can be conducted in this direction. The use of Caoutchoucine—a distillate from the destructive distillation of rubber—as a denaturant should not be enforced upon the works carrying out

experiments in this line. Besides, being too costly, it gives a gummy residue which chokes the valves and jets of the engines. A cheaper de-naturing agent of the Pyridine or Benzene series should be given a fair trial.

3. The import duty on molasses must be high so that foreign molasses may not invade the Indian market.

The following quotation from M. P. Gandhi's brilliant book on "Indian Sugar Industry" will be read with interest :—

"On the successful production of power alcohol, a great deal of success of the Sugar Industry hinges. The potentiality of exporting sugar would depend still more on the success achieved in this direction, as then alone will it be possible to bring down the cost of production to the level of other countries like Java, Cuba, Philipines and Hawaiian Islands". (Page 27).

Cost of Producing Power Alcohol.

It has been discussed previously that in almost all sugar producing countries in the world, there are legislations by which the importers of petrol are compelled to mix power alcohol in certain proportion with petrol to be used as a fuel in internal combustion engines. In fact, it has been found in those countries that this is the most profitable outlay in utilizing this chief by-product of this Industry.

Since the season 1935-36, molasses in most of the factories in Northern India has been practically wasted for nothing. Not only that, some expenses are to be incurred to effect this wastage. The dire necessity of utilising this by-product was repeatedly impressed upon the Government but with no success. The Indian Sugar Mills Association, the Federation of Indian Chambers of Commerce & Industry and other commercial organisations requested the Government to grant free licenses to start distilleries for the manufacture of Power Alcohol but Sir B. C. Burt speaking on behalf of the Government at a meeting of the

Sugar Committee of the Imperial Council of Agricultural Research held at Simla on the 2nd July, 1935, announced that they were not in favour at all to encourage the production of Power Alcohol from molasses. This most unwise decision of the Government at that time did seriously affect the Industry as the last hope of securing the Government's favour for producing this Alcohol was shattered.

But, the serious depression which overtook the Industry since the beginning of the crop season 1935-36 has changed the attitude of the Government. They now want to give some relief to the Industry after it has been severely hit by the depression and by their own action in enhancing the excise duty from Re. 1 to Rs. 2 per cwt. against the teeth of all opposition. It is most gratifying to note that at its recent meeting held at Simla in the month of May, 1937, the Sugar Committee have unanimously decided to recommend to the Central Govt. to grant licenses for the production of Alcohol from molasses on the condition that the manufacturer has to pay an excise duty of 10 annas per gallon of Alcohol which is equivalent to the import duty on petrol. This decision, though late, will be welcome by the Industry and it will help a long way to stabilize it.

It was expected that in arriving at this very important decision, the Sugar Committee would not insist for this heavy amount of excise duty on alcohol at least at the initial stages of this Alcohol Industry. But obviously, this has been done to counter-balance the loss of Govt. revenues derived from the import of petrol. The difficulties which still now remain for the establishment of this Alcohol Industry are that the Government should relax the excise regulations in using de-naturants and to enact that petrol, before sale, must be mixed with the requisite amount of alcohol so that the resultant mixture may be used as a motor fuel.

When the Government now intend to lift the ban for producing Power Alcohol from molasses, it will not be out of

place to give some idea regarding its cost of production. It is very difficult to collect accurate data as the owners of the few distilleries, now existing in India, are extremely reluctant to divulge their 'trade secrets'. The following costs are given from an estimate of Mr. Jean Caupin, Engineer Chemist and Representative of Messrs Pingris et Mollet Fontaine, Lille (France)* :—

Basis of Calculation.

We will take for our basis of calculation the following which are actually those that we meet most often in India :—

Output of the sugar factory :—400 to 600 tons.

Capacity of the Distillery ;—750 mds. of molasses, i. e., about 1, 500 Gallons minimum of alcohol in every 24 hours.

200 working days, making an annual production of 300,000 Gallons.

Price of molasses at 4 as. per Bengal maund.

Fuel wood at Rs. 7 a ton.

1 lb. of wood gives 2 lbs. 8 oz. of steam.

i.e. price per lb. of steam is Re. 0/0/0,24.

We shall assume that the steam will be supplied by the boilers and the water by the pumps of the sugar factory.

* The said French Company has supplied a complete Distillation Plant to the Mysore Sugar Co. Ltd., one of the best sugar mills in India. The figures of the cost of production of alcohol, as given above, have actually been worked in the Distilleries of the said sugar mill and have been confirmed.

Cost of obtaining a Gallon of Rectified Spirit.

1. Building and materials, about Rs. 187,500 to be redeemed in 10 years, i.e. per gallon	...	Re. 0-1-0
2. A maund of molasses ought to give two gallons of alcohol	... ..	Re. 0-2-0
3. Consumption of steam in starting from fermented wines to obtain rectified alcohol : 38 lb at Re. 0-0-0,24 per lb. i.e.	... ..	Re. 0-0-9,12
4. Chemical products	... ..	Re. 0-0-0,73
5. Labour and staff : 9 men and 3 Chemists		Re. 0-0-3
6. Overhead expenses (Insurance, fire, interests, upkeep, office expenses)	... ..	Re. 0-0,4
Total expenses per gallon of rectified alcohol	... ..	Re. 0-4-4,85
i. e. about -4-6 per gallon.		

Cost of obtaining a Gallon of Absolute Alcohol - First Technique.

1. Cost of rectified alcohol	... ..	Re. 0 4-6
2. Consumption of steam, starting from rectified alcohol to obtain absolute alcohol : 13 lbs. of steam at Re. 0-0-0,24 per lb.	... ..	Re. 0-0-3,12
3. Loss of alcohol, i.e. the difference between the quantity of alcohol that enters and that which comes out of the dehydration apparatus:— 0,15 p. c. at Re. 0-4 6 a gallon	... ..	Re. 0-0-0,08
4. Loss in carrying liquid (Benzol) : 0,04 p.c. at Rs. 3-7- per gallon	... ..	Re. 0-0-0,28
5. Materials, about Rs. 50,000 to be redeemed in ten years	... ..	Re. 0-0-3,20
6. Staff : 2 men	... ..	Re. 0-0-0,20
7. Royalties, about	.. ..	Re. 0-0-5,50
Total price per gallon at 100°	... ..	Rs. 0-5-6,38
i. e. about -5-6 a gallon.		

INDIAN SUGAR INDUSTRY

Cost of obtaining a Gallon of Absolute Alcohol—Fourth Technique.

Directly obtaining absolute alcohol, starting from fermented wines.
 Same consumption of steam as for rectified alcohol, less "Nauvais
 gout" (4 p. c. instead of 10 to 15 p. c.)
 No. loss in alcohol.
 Same staff.
 As a result of which, the cost price is the same as that for rectified
 alcohol.

i. e. -4-6 a gallon.

Consumption of Alcohol as Motor Fuel in different Countries for 1934.
 (In thousand U. S. gallons)

Austria	...	1,018 Gallons.
Brazil	...	7,000 "
Cuba	...	2,367 "
Czechoslovakia	...	13,190 "
France	...	54,400 "
Germany	...	45,580 "
Hungary	...	2,106 "
Italy	...	1,402 "
Jugoslavia	..	995 "
Poland	...	1,700 "
Sweden	...	2,400 "
United Kingdom	...	433.5 "

Use as a fertilizer.

Normally, the average composition of Indian molasses may be taken as follows :—

Cane Sugar	...	...	40 p.c.
Non-crystallizable sugar (glucose)	...	...	30 p.c.
Phosphates	...	...	0'5-0'7 p.c.
Combined Nitrogen	...	...	0'5 p.c.
Potash	...	...	2-5 p.c.
Rest	...	...	Water.

It will be seen that molasses contains potash as one of its constituents and this potash, as is well known, plays a very important role in the evolution of plant life. It is also one of the most important ingredients of the soil and it has been found that an acre of land, under cane, consumes about 150 lbs of potash. If the fertility of the land is to be preserved, it is essential that this loss in potash should be recouped or compensated. The Indian Royal Commission on Agriculture in 1928 observed in their Report that Indian soils were mainly deficient in potash or combined introgen and the nitrogen deficiency is one of the most serious problems in Indian Agriculture.

Manurial utilisation of molasses has been a problem of long outstanding. Cross as early as in 1911 carried out a series of experiments on the value of molasses as a fertilizer and proved that, on an average, it yielded 3 mds. of nitrogen per gram of sugar used. He also showed that the bacteria which helped the assimilation of nitrogen were multiplied and made active by the addition of carbohydrates furnished from molasses. Attempts to utilise it as a manure in Java date back from 1911. It has been found that an increase in the production of rice to the extent of 43 per cent can be obtained by using molasses at the rate of 1,500 gallons per acre of land. Kuyper (1926) showed that the addition of molasses, on certain types of soil of bad quality, exerts a very favourable influence. In a comprehensive Report, issued from Java, Melaselumestig (1932), makes an excellent review regarding the various research works carried out in that Island for utilising molasses as a manure. The generalisations arrived at are as follows :—

- (a) Most beneficial results are obtained by applying molasses with irrigation water to the extent of 1 blik per guel (1 blik = 18 litres and 1,000 guel = 1 nectre).

- (b) This application must be made at least 3 weeks before the planting of the crop.

Russel (1932) observes that "increased yields of sugar-cane have followed the application of molasses to soil at the Station Agronomique and on Mr. Ebbels' estate at Mauritius where the residual effect is well shown and also in Antigua."

The manurial value of molasses in Mauritius will be evident from the fact that as a rule, the planters insist for a return by the factories of a certain percentage of molasses obtained from the canes delivered by them to the factories. This molasses, they use as a fertilizer and apply it to the field a month or fortnight before planting. The various investigations, carried out in this direction, show "that manurial properties of molasses are chiefly due to the sugars present therein. It is true that equivalent amount of phosphates and combined nitrogen present in the molasses produce beneficial results when added to the soil, but these results are insignificant in comparison with those obtained with molasses."

Exhaustive and far-reaching works on the use of molasses as a fertilizer in U. P. have been carried out by Batham, Sethi and Nigam and they have arrived at the following important conclusions : -

- (a) The ash content of molasses varies between 5-10 p.c. and they are poor in nitrogen but rich in potash.
- (b) The application of molasses two months before planting has been found to give a better out-turn of planted canes and sucrose. The rate of application is 180 to 270 mds. per acre.
- (c) The juices of the planted canes, so treated as above, do not show any decrease in the sucrose content.
- (d) The nitrogen content of the soils, treated with molasses, has been found to increase on the application of molasses.

- (e) Beneficial results are obtained when molasses with water are applied before sowing the crop and the soil is kept under good acriation.
- (f) The effect of molasses as a manure has been found to be more pronounced on poor than on rich soils.

It was a known scientific principle from the time of the great French Chemist Pastur that the fixation of nitrogen in the soil could only take place through the presence of living bacteria. But, the researches of Prof. Dhar and his pupils at the Allahabad University proved conclusively that the bacterial presence was not necessary for the fixation of nitrogen in the soil which could easily take place due to the oxidation of the energy rich carbohydrates present in molasses. This oxidation caused fixation of atomospheric nitrogen in the soil and this process increases the amounts of nitrates and ammonium salts. The only agents required for this oxidation are sun-light and small amounts of activated substances like manganese and copper compounds. The following important results have been obtained from Prof. Dhar's research works :—

- (a) Molasses when mixed with the soil will conserve and also add combined nitrogen to it and thus the deficiency in potash caused due to canes will be made up. The fertility of the soil will therefore be preserved.
- (b) Molasses to the extent of 90–270 mds. per acre when added to the soil will confer best results to it.
- (c) Being mixed with water, it should be added to the soil $\frac{2}{3}$ months before the actual time of growing the crop.
- (d) Molasses should never be added to the soil after the plantation has been done.
- (e) The results obtained at the Farms show that an increase of 36 p. c, in the yield of sugarcane has

been obtained by adding molasses to the soil before plantation. This epoch-making work of Prof. Dhar and his collaborators have proved conclusively that when molasses are applied to the soil, the oxygen of the air combines with the sugars of the molasses and liberates energy which is so essential for the fixation of atmospheric nitrogen to the soil. This process fixes the nitrogen of the air with the oxygen and increases the fertility of the soil to a considerable extent. It has been further proved that molasses not only fixes atmospheric nitrogen when added to the soil but acts as a protector of the soil nitrogen and hence it would prove to be a valuable manure specially in tropical places.

It will thus be evident that if the above results are confirmed, a new avenue and a very easy and cheap one will be opened for the utilisation of Indian molasses. The attention of the Government and the sugar-mill owners is to be immediately focussed to this important work of Prof. Dhar.

As a Fuel.

"Molasses can also be used as fuel. Some experiments were carried out in Java and a few factories burnt a mixture of bagasse and molasses. In Australia, several mills burnt molasses as a fuel in their furnaces. Molasses mixed in small proportion to bagasse burn well and produce profitable calories. This practice is followed in many centres in the Philippine Island when there is a shortage of bagasse or when this has only a small calorific power, which happens at the beginning of the milling season, but the requisite quantity of molasses is too small for this purpose to solve the problem of its disposal." (Gandhi—Indian Sugar Industry. p. 107)

Molasses as a Cattle Food.

Extensive researches carried out at the H. B. Technological Institute, Cawnpore, (now the Imperial Institute of Sugar Technology) under the able guidance of Mr. R. C. Srivastava, Sugar Technologist, have proved that molasses when mixed with oil-cakes and bagasses-screenings in varying proportions and then being pressed into cakes served as a good cattle food. A sum of Rs. 10,000/- has been sanctioned by the Imperial Council of Agricultural Research to carry out these research works at the said Institute and the results are being keenly awaited by the Industry.

Works of far-reaching importance have also been carried out at the Punjab Agricultural College at Lyallpur by Prof. Labh Singh and G. Singh, in this direction, and we take the liberty of quoting the following extract from their original paper :—

“Twelve bullocks were fed an two lbs. of factory molasses and twelve on two lbs. of maize for 140 days, basal ration being the same in both the cases. They were put to the same work throughout the experimental period. The live weight of the animals was well maintained. No evil effect of feeding factory molasses was observed on the health of the animals during the experimental period and for fourteen months afterwards. It, therefore, indicates that 2 lbs. of factory molasses could replace 2 lbs. of maize in a fixed ration for bullocks in winter season.”

More exhaustive research works should be carried out in this line before molasses can be confidently recommended as a good cattle food.

Molasses for Road Making.

Experiments made at the said Institute at Cwanpore have opened a new chapter in the industrial use of molasses as a Road-surfacers. It has been found that molasses mixed with pitch in different proportions have yielded better results in road-

surfacing than tar-macadum. It has been calculated that the entire cost for covering per sq. yd. of a road with a layer of 2" inches of stone coated with molasses macadam comes to about 0-11-8 but in the case of tar-macadum, it is about 15 as. for the same work.

It will be evident from the above that this avenue for the utilisation of molasses should be fully explored without any further delay so that a new use of molasses can be achieved with success.

Before we conclude our remarks on utilisation of molasses as a road-surfacers, it will be quite interesting to go through the following extract, taken from a note by the Director of Imperial Institute of Sugar Technology, appearing in a very recent issue of "Indian Trade Journal" :—

"Attempts to convert molasses at the Imperial Institute of Sugar Technology into an insoluble resinous product suitable for use as road surfacing material have been fairly successful. The improved process of manufacturing the composition consists in carrying out the resinification of molasses with a mixture of coal tar and asphalt in the presence of acids such as sulphuric acid. The carbohydrates contained in molasses combine with the phenolic bodies contained in asphalt and coal tar to form a resinified compound perfectly insoluble in water satisfying the following conditions :—

- (i) Perfect liquid at the time of application.
- (ii) After being spread on the road not melting in summer.
- (iii) Not wearing away in heavy traffic.
- (v) Cheaper than other asphalt preparations in the market.

The success of the operation depends upon the preliminary removal of the last trace of moisture from molasses before mixing it with other ingredients. Exhaust molasses are

concentrated in an iron pan with constant stirring until the temperature rises to 135°C with progressive thickening so that the molasses can be drawn into strings. Dilute sulphuric acid corresponding to 1 per cent of the weight of concentrated molasses is added slowly and heated until the temperature rises further to 210°C . A mixture of asphalt and coal tar is melted in a separate furnace fitted with mechanical stirrers and treated with dilute sulphuric acid. Molasses treated with sulphuric acid, as described, are then gradually incorporated in the acidified liquid asphalt and coal tar mixture, the stirrers running constantly. When the requisite proportion has been added, the heating is continued at atmospheric pressure till the test samples show absolute insolubility in water. The product is obtained in a pasty condition easy to handle and suitable for application in stone chips. The solubility of the product is almost nil. The top surface of the molasses tarmacadam composition sometimes shows signs of peeling off at the surface after two or three months, unless a suitable seal coating material is applied which should make the surface quite smooth. A good seal coating material is prepared by dissolving the molasses-asphalt-coaltar composition in the proportion of 1 lb to 1 gallon of coal tar. The seal coating material is quite liquid and easy to apply to the road surface. The road composition and seal coating material have been protected by Indian Patent No. 24582. The note then describes, in details, how molasses tarmacadam should be applied in the building of roads and in conclusion, gives details of costs, for example.

	As.
Cost of molasses 132 lbs. @ -/4/- per maund	6.41
Sulphuric acid, 1.15 lbs. at -/1/- per lb	1.15
Asphalt, 13 lbs. at Rs. 160/- per ton	14.30
Coal tar, at Rs. 1-14 per gallon, including container	7.50
Labour	5.40
	34.75

The above will produce 106.25 lbs of the road composition.

Hence for the manufacture of 1 ton of the road composition, the cost will be Rs. 45-12-0

(Note : But the cost of asphalt is Rs. 160/- per ton).

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CHAPTER VI.

Problems Before the Industry.

The first stage of protection given to this Industry expires by the 31st of March, 1938 under sec. 2 of the Sugar Industry (Protection) Act, 1932. The Tariff Board, appointed by the Government of India to enquire as to what extent the Industry can claim protection for the second stage, i. e., upto 31st March 1946, have already finished their labours and forwarded their Report to the Government. The decisions of the Central Government on the recommendations of this Board are being keenly awaited by the Industry.

It is true that during the last six years, the Industry has made tremendous progress under the wings of protection. From a first class sugar importing country, India has now produced more sugar than her requirements. But it must also be admitted that her progress in developing this Industry has so far been mainly confined to the manufacturing sides only. There are serious problems affecting this Industry which must be tackled from now if it wants to stand on its own legs. It must not be forgotten that whatever might be the future degree of protection, it must be for a temporary period. No Industry can ever claim perpetual protection. Therefore, it is desirable to discuss, in details, the problems which now confront the Indian Sugar Industry from the field to the market. :—

The different problems which now face this Industry may be discussed under the following heads :—

- (i) Raw Material.
- (ii) Actual Manufacturing Process.
- (iii) By-products.
- (iv) Marketing.

1. Raw Material.

The sugarcanes are the principal materials which are used for producing white sugar in India. The problems which surround the production of this crop may be sub-divided as follows :—

- (i) Plantation and harvesting.
- (ii) Fixation of reasonable price for canes.
- (iii) Transport from the fields to the factory.

It is needless to state that the cost of sugar mainly depends on the yield of cane obtained per acre. The higher the cane acreage, the better will be the profit out of manufacturing process. The growing of cane, in more advanced sugar producing countries, is invariably made either on their own estates or on leased lands of the factories. This practice enables the manufacturers to keep a very close supervision by their own men on the plantation side of this Industry. But in India, the majority of the factories are to depend for their supply on the agriculturists who possess small holdings of cultivation at their own disposal. The system of having own cultivation either on acquired or leased lands is not yet so extensively practised in India. The result will be evident from the following table :—

Countries.		Cane tons per acre.
Java	...	45
Hawaii	...	45
Cuba	...	20
Queensland	...	20
Mauritius	...	20
South Africa	...	20
India	...	16

It will thus be apparent that in the first stage of sugar manufacture, i. e. on the plantation side, India lags far behind. If she has to compete with these countries, she has to make immediate improvements on the agricultural sides. Her

standard of cultivation of cane must be interesting to note that the average price of cane paid by the Indian manufacturers is yet -/5/- a maund in the minimum. In comparison with these countries, the price is too exorbitant. The reasons for this prohibitive price of cane in India are lower yield in cane acreage and consequent high cost of plantation. The causes for this lower yield may be summarised as follows :—

- (a) Absence of improved varieties of canes giving higher yield in crop as well as in sucrose content.
- (b) No use of fertilising materials.
- (c) Absence of irrigation and drainage facilities.
- (d) Attack of diseases and pests in the canes.

Improved Varieties of Canes.

The increase in cane acreage and sucrose-content is invariably associated with the nature of seedlings used for plantation. Huge amount of money is being spent annually in advanced countries for research works to find out new varieties of canes more suitable for sugar manufacture. In fact, this is the most cardinal point in the whole chain of sugar manufacture. The following table will prove that although India has made some improvements in this direction, but this progress, consistent with the present position of this Industry, is not at all satisfactory :—

Year.	Acreage under improved varieties	Cane ton per acre.
1931-32	1,170,478	14.1
1932-33	1,845,788	14.9
1933-34	2,295,257	15.3
1934-35	2,445,719	15.1
1935-36	2,700,000	15.2
1936-37	2,800,000	16.5

The introduction of the Co. canes has improved the yield of cane per acre to a very great extent upon the "Deshi"

varieties but the problem of the deterioration even of this improved variety of cane in Northern India is yet to be solved. More intensive research work is urgently necessary in this direction. The Resolution, as passed by the meeting of the Sugar Committee held at Simla on the 2nd of July, 1935, drew the attention of the manufacturers to this very important point :—

“The Committee is of opinion that progress in sugar research and agricultural development has not been rapid as it ought to have been. In order to place the Indian Sugar Industry on a sound basis within the remaining period of Protection, more intensive work is required in several directions more specially in those connected with the improvement of the quality of the raw material, the raising of the standard of sugarcane cultivation and the more rapid multiplication and introduction of new seedling canes of proved value and their supply to cultivators.”

It is most gratifying to note that at the recommendations of the Imperial Council of Agricultural Research, the Government of India have agreed to consider to grant annually a subsidy equal to 2 as. per cwt. on the excisable sugar produced in India for meeting the expenses for improving the quality of canes. It is also pleasing to note that out of the proceeds of Sugar Excise Duty, as allotted to the various Provincial Governments, comprehensive schemes for the general improvement of the cultivation of canes on the co-operative basis have been formulated and carried out to some extent by the Governments of U. P. & Bihar. But it is equally disappointing to note that other Local Governments, specially the Government of Bengal, are lagging behind to tackle this important problem of plantation. No scheme in this direction has yet been prepared by the Bengal Government although a sum of Rs. 45,000/- allotted to this Government out of the proceeds of the sugar Excise

Duty for 1935-36 and 1936-37 is still lying idle. In the eighth meeting of the Sugar Committee held at Simla on the 8th & 9th July, 1936, Mr. Srivastava, the Imperial Sugar Technologist, emphasised that the future activities of the local Governments in connection with the cane crop should be concentrated on the improvement of the quality of cane and the lowering of its cost of cultivation and not to an extension of the area under cane. In India, there are only a few factories which give their best attention to raise the standard of cultivation of cane surrounding their factories. The Belapur Sugar Factory in Bombay and the Mysore Sugar Factory Ltd. are doing excellent works in this direction. It is claimed that the improved varieties of canes, even superior to the Java qualities, have been produced at the Hebbal Farm at the Mysore State. This claim is justified by the fact that the average recovery of the mills in Southern India is highest in India. The Indian cultivators do not get any practical encouragement or help either from the factories or the Government Departments to raise the present standard of cultivation by adopting upto-date scientific methods. Majority of the Indian mill-owners do not take any interest, whatsoever, in advising the cultivators to grow the right type of canes under modern conditions surrounding their factories. The activities of the Cane Departments of the Indian factories are practically nil in this direction. Most valuable works can be done by these Departments during the time of plantation, but unfortunately, the Indian factory-owners consider the expenses, to be incurred in this direction, as wastage of money. This impression from their minds must disappear. They have to spend money liberally in this direction to stabilize the Industry. Active co-operation amongst the factories, Governments and the Cane-growers is absolutely essential to improve the quality of cane in India. It is pleasing to note that the Central Government are anxious to render all possible help in this matter of cane cultivation based on upto-date lines. They are gradually realising the truth that the

prosperity and future of the second largest Industry in India is inter-woven with the standard of cane cultivation. It must be admitted on fairness that most valuable works on cane breeding have been carried out at the Imperial Sugar-cane Research Station at Coimbatore. At their meeting held on the 8th of July, 1936, the Sugar Committee of the Imperial Council of Agricultural Research, have decided to finance various schemes of research on sugarcane in various Provinces. A piece of important research work of outstanding merit, beset with future potentialities, has been carried out at Coimbatore by Rao Bahadur T. S. Venkataraman in 1937 regarding the hybridisation of sugarcane and bamboo. If his works ultimately prove successful, this new plant, a combination of the qualities of sugarcane and bamboo, will grow even in driest places. The Committee have also requested the various Provincial Governments to share half of the expenses to be incurred in this direction. At their Annual Meeting held in Delhi on 5th of April, 1936, the Federation of Indian Chambers of Commerce and Industry passed the following Resolution :—

“The Federation is of opinion that more rapid and intensive steps should be taken by the Central Government through the Imperial Council of Agricultural Research and by the Provincial Governments to raise the standard of cultivation of cane both as to quality and quantity by the establishment of cane nurseries in all cane-growing provinces, in which, canes of high sucrose content and early and late ripening varieties would be propagated for wider distribution to the ryots.”

It has been stated above that useful works for the improvement of quality of canes are being carried out by the Governments of Bihar and U. P. out of the subsidy of the Excise Duty allotted to them by the Central Government. In 1936-37 season, the Bihar Government employed a number of demonstration praties which gave practical lessons to the cultivators

regarding the modern methods of cultivation, manuring, selection of right type of seedlings etc. These parties selected their fields of operation near about the sugar factories. Every possible assistance was given to these parties by the factories and the Government of Bihar expect to get substantial result in this direction. The Government of the United Provinces have adopted schemes for the better marketing of sugarcane on co-operative basis and the installation of tube-wells in certain areas to create better irrigation facilities. They also intend to establish seed farms in different cane-zones from where improved varieties of seedlings will be distributed amongst the cultivators at slightly lower prices. They propose to have one such seed centre for every 200 acreage of cane. Supply of manures to the ryots on credit system against the next crop forms one of the objects of their schemes. Co-operative Societies of the cane-growers have been set up in the cane areas and the factories are urged to make their purchase of canes through these organizations on commission basis. The Governments of Bombay and the Punjab have also developed schemes for the establishment of cane-growers' Co-operative Unions for the supply of sugarcane to the factories. The Government of Burma have, however, decided to spend their amount of subsidy in the following directions :—

- (a) Propaganda works for improving the methods of cane cultivation.
- (b) Free supply of fertilizers.
- (c) Free distribution of improved Java cane seedlings to selected cultivators.

It is thus abundantly clear that the different Provincial Governments have now fully realised the extreme importance to raise the present standard of cultivation of cane. But, in our opinion, the Industry itself is still indifferent to this urgent need. The mill-owners must focuss their immediate attention to this aspect of the Industry. They must fully appreciate the fact that the cost of raw material is the most vital factor in

manufacturing process and they will not be able to send their sugar beyond the limits of the Indian Ocean to the world markets until the price of cane is brought down to a substantial degree.

Irrigation.

Irrigation and drainage have important bearings on the growth of cane and consequently on the return of sugar per acre. The following figures taken from a plantation estate from the Hawaiian Islands will speak for itself :—

Tons of sugar per acre.

Irrigated soil	...	6.713
Rain fall	...	3.693

Huge sums of money are being annually spent in Northern India for irrigation purposes but in some parts of that tract, the problem is yet baffling. In a most learned address delivered by Sir William Stampe, Kt. C. I. E. formerly, the Chief Engineer to the Government of U. P. at the eighth meeting of the Sugar Committee held at Simla in July, 1936, he discussed the potentialities of under-ground water supplies and hydro-electric development in U. P. with special reference to the sugarcane cultivation. He pointed out that enormous resources of sub-soil water could be utilised for irrigation purposes by boring tube-wells to be worked out by hydro-electricity. He estimated that to give 110,000 gallons per watering to each acre of sugarcane, the cost is Rs. 3-14-0 per acre in the hot season when electricity was to be charged at -/2/3 per unit and Rs. 2-9-0 per acre for water given to the rainy season at lower rate of 0-1-6 per unit. This will remove, to a very extent, the problem of irrigation in U. P. This bold scheme of tapping the subterranean sources of water supply

was very thoroughly investigated by the Government of the United Provinces and after being fully convinced of its success, due sanction has been accorded to it. The project visualises the erection of about 1500 tube wells which will command irrigation of about 6,25,000 acres of land. The distribution of these tube-wells has been made in such a way that each one will be able to supply water to an area of 2 square miles with an approximate area of 1,000 acres of land. This scheme, when fully worked out, will provide excellent irrigation facilities to some of the western districts of U. P.

The capital outlay for the project has been estimated at Rs. 114 lakhs and this expenditure includes the distribution channels for 1500 tube-wells, roads and buildings. The scheme is expected to yield a gross revenue of Rs. 38 lakhs on the assumption that the wells will work for 1,000 hours during the first year, 2,000 hours during the second and 3,000 hours during ultimate years. The gross revenue on the basis of 3,000 hours running is expected to be Rs. 38½ lakhs per annum.

Crushing Season.

Another important factor in the manufacture of sugar is the duration of a crushing season. The longer the season, the better will be the production thus lowering down the over-head charges. When compared with other sugar producing countries, an average season of four months' duration in India is rather short.

<i>Countries.</i>	<i>Crushing seasons.</i>	<i>Duration.</i>
Cuba	January—June	6 months
Hawaii	December—Septr.	10 „
Java	May—November	7 „
Mauritius	August—December	5 „
Natal	May—December	8 „
Queensland	June—November	6 „
Egypt	December—April	5 „

The duration of a season depends primarily on the maturity of canes which, on turn, is dependent upon climatic conditions. Research works should, therefore, be undertaken to introduce early, mid-season and late varieties of canes in the vicinity of the factories. The introduction of each of the above varieties must be very carefully selected by testing the different conditions of the soil. Commendable works in this direction have been carried out by the Agricultural Department of the Bihar Government in 1936-37 season. Special attention was focussed by them on the following problems :—

1. To reduce the cost of cultivation of cane and to obtain maximum yield per acre from the existing and improved varieties.
2. To adjust the manurial and water requirements of different varieties of canes.
3. To study more closely the introduction of more suitable and desirable varieties of canes with a view to extend the crushing season.
4. To demonstrate the best time and mode of planting.
5. To study the advantages of soaking setts to ensure full germination and heavy growth.
6. To fix the maximum distance apart in rows in the case of early, mid-season and late varieties.
7. To study the detailed conditions for the application of organic and artificial manures.
8. To devise ways and means to reduce deterioration and dryage of canes during transit.
9. To stop the wasteful process of cutting tops for fodder purposes before the canes are matured.
10. To devise simple methods to test the ripening of canes in the fields.
11. To reduce the chances of infection of canes by different pests and diseases.

The details regarding the above works have been very beautifully described in a Note issued by the said

Agricultural Department in 1936. The attention of the various Provincial Agricultural Departments is specially invited to the valuable schemes of work adopted by the Bihar Government.

Fertilisation.

Another most important factor which contributes to the better return of cane per acre is the proper use of fertilizers. The Indian cultivators are extremely conservative in this respect. They are hopelessly out of touch with the modern ways of fertilisation and follow their old and traditional means of crude manuring. The result has been that they get only 15 to 16 tons of cane per acre while 45 to 46 tons per acre is the average yield in Java where selection and application of proper manure constitutes an important item in the programme of field organization. The Indian ryots do not know that for each out-turn of crop, the soil is robbed of its fertility. This is more pronounced in the case of the Co-canes which give better yield than the "*Deshi*" varieties at the cost of the productivity of the soil. So, manuring is essential in those tracts of lands where the Co-canes are grown. The soils, which are exhausted of potash and other plant food, are thus recouped by the application of fertilizers. Dr. Mirchandani, Agricultural Chemist of Bihar, is of opinion that of all kinds of manures, farm yard manure is the best and should be used freely. Oil-cakes, Superphosphates, Niciphos II etc. are the cheap varieties of manures. Niciphos II has admirably suited the soil of North Bihar where it is used extensively. It has been found that this should be applied for cane @ 2 mds. per acre at planting and 1½ mds. per acre during the time of earthing, that is, a total quantity of 3½ mds. per acre. It has been estimated that the total manurial cost for a complete dressing is Rs. 23 per acre in North Bihar. The beneficial effects of the application of manures will be evident from the fact that while the return per acre without fertilizers is about 400 to 500 mds. of cane, this yield

has been raised to as high as 1000 to 1200 mds. per acre with the use of manures. The experimental details regarding the use of fertilizers have been very exhaustively described in a bulletin entitled "The Cultivation of Sugarcane in North Bihar" published in January of 1936 by the Agricultural Department of the Bihar Government. This booklet should be read very carefully by those interested in the plantation side of sugar manufacture in India.

The manures may be broadly divided into two different classes, e. g. organic or natural manures, such as farm yard or pen manure and artificial manures, e. g. Sulphate of Ammonia, Nitrate of Soda, Nitrate of Potash, Superphosphate etc. It is needless to say that the application of farm yard manure has given the optimum results but where it is not easily available or costly, recourse has to be taken to the use of artificial fertilizers. Production of 'pen manure' becomes profitable in those countries which employ animal traction for cane cultivation. British West Indies and Mauritius pay much attention for the production of this kind of manure on commercial basis. It is generally applied at the rate of 10 to 20 tons per acre of plant canes when they attain a growth of 3 months. It is used in the case of plant crop only. As nitrogen is the most important element to be considered in the fertilization of sugarcane, it is necessary to have some idea regarding the quantity of readily available nitrogen present in the different kinds of these artificial manures.

<i>Name of the manure.</i>		<i>Percentage of available nitrogen.</i>
Sulphate of Ammonia	...	20-21 p. c.
Nitrate of Soda (Pure)	...	16.5 "
Nitrate of Potash (Pure)	...	13.8 "
Seed-Cake manures	...	4.8 " (Depending on the nature of seeds).
Cyanamide (Lime Nitrogen)	...	20 "
Nitrate of Lime	...	12 "
Bone manures	...	4.6 "
Super-phosphates (Soluble)	...	40-50 " (Phosphoric Acid).

Opinions regarding the effects of manuring on the composition of cane seem to be divergent. But it is agreed that canes, heavily manured with more readily available nitrogen, increase in weight. Phosphatic manures have been found to increase the sugar content of cane. Lime produces a sweet and pure juice and neutralizes the acidity of the soil—resulting out of the presence of excess of organic matter or for continuous application of ammoniam salts. It also renders the potash available to the soil. The form, in which lime is used as a manure, is either as the carbonate or as quick-lime. But the former has now found an extensive use. In Hawaiian Islands, lime is applied to the land to the extent of 1000 lbs. per acre. Amongst the Nitrogen manures, Sulphate of Ammonia is widely used due to its readily availability and cheap price. In Java, it is often the only manure used. The average quantity applied is 350 lbs. per acre. It is placed by hand directly at the foot of the cane stool. Sometimes, the requisite quantity is applied through holes made in the ground by means of an implement. Sulphate of Ammonia, in the form of tablets, is also used. Nitrate manures are chiefly used in Hawaiian Islands and Egypt. The quantity to be used ranges even upto 400 lbs. per acre.

In India, due to the conservative ideas of the cultivators, use of manures is regarded as an expensive "experiment". The majority of them seem to have no faith in their efficacy. But constant propaganda by the Provincial Agricultural Departments has changed their out-look to some extent. It is here also that the mill-owners can deliver a lot of goods to the cultivators by advancing proper manures to them against their crop. In U. P., the application of fertilizers has raised the yield from 500 mds. to 1200 mds. per acre. Commendable works, in this direction, have been done by the Mysore State on the Irwin Canal areas. Intensive use of selected manures has increased the yield of cane to about 35 tons per acre. The cultivators have been trained to adjust their time of planting to the needs of the

factories resulting in a comparatively long crushing season of about 9 months' duration. Mechanized cultivation is also being practised in some parts of the State. The details regarding the achievements of the Mysore Government, in raising the standard of cane cultivation, have been explicitly described by Dr. Coleman in an Agricultural Bulletin under the caption "The Development of Sugar Industry in Mysore."

Very recently, considerable significance has been attached to the utilization of molasses as a fertilizer due the epoch-making researches of Prof. Dhar and his students at the Allahabad University. They claim that when molasses, being hydrated, are applied to the soil varying from 90 to 270 mds. per acre, the yield is considerably increased. The experiments, carried out at the Shahajanpur Government Farm, showed that when molasses were added to the soil before planting, the return of the crop per acre had been found to increase by about 36 per cent. The mechanism of molasses to be used as fertilizers and other cognate details have been discussed at length in a different chapter.

Pests and Diseases.

Like all other natural crops, cane is also subject to frequent attacks by pests and diseases. These visitations by pests and insects cause considerable damages to the crop thus inflicting severe loss to the manufacturers as well as to the cultivators. In an epidemic year, this damage has been found to go as high as 75 per cent but an average damage of 20 per cent is always a common occurrence. An investigation, carried out by the Director of Agriculture of Bihar in 1934, revealed the fact that about 30 per cent of the cane crop was diseased. During 1935-36 season, top shoot borers and smuts wrought serious damages to the cane crop in several places of the United Provinces. The crop in the Nellikuppam-Pakur area was

very badly damaged in 1934-35 by the incidence of *Pyrilla* plague. An examination of the meteorological reports showed that this out-break had been preceded by an unusual and heavy rainfall in March of 1933. It was concluded that this heavy downpore had increased the amount of soil moisture thereby favouring the breeding requirements of the bug.

The principal infestations which have been found common in India are as follows :—

- (1) Borers.
- (2) Leaf hoppers.
- (3) White flies and white ants.
- (4) Of the fungus diseases—red rot is very much prevalent in Bengal but is rare in Bihar. Repeated ratooning has been suggested as one of the main causes for the spread of these pests.

White ants generally attack the plant canes and have been found to be controlled by deep farming and by mixing crude oil emulsion with irrigated water. Attacks by cane borers cause the sucrose content of the canes fall to an appreciable extent while the content of reducing sugar remains in tact. But top borers do not affect the sucrose percentage but cause an increase of reducing sugar.

The causes, which lead to the cane crop being diseased and infected with pests, may be summarised as follows ;—

- (i) Unhealthy and bad cane cultures.
- (ii) Water logging conditions in the cane fields, i. e. bad drainage system.
- (iii) Accumulation of tops, leaves and trash in the fields—after the crop has been cut—which provide excellent facilities for the breeding place for micro-organisms.
- (iv) Extended ratooning.

It will be admitted that the best protection is prevention and best way of preventing or reducing chances of attack is by good and clean cultivation. Distribution of healthy cane cultures is the surest preventive measure. Infection of the crop can, therefore, be reduced to a very great extent if intensive propaganda—advocating the said measures—is made amongst the cultivators and good cane cultures are distributed free of any cost or at least on nominal charges. They must be taught the beneficial effects of plant hygiene and improved agricultural methods. They must learn that when the crop becomes healthy, it automatically acquires the powers of resisting the diseases.

The different means, which have been suggested to control the pests and diseases in canes, may be broadly divided into two classes ;—

(i) Artificial contrivances, e. g.

(a) Use of poisonous preparations by spraying. This is rather costly and its effects are temporary.

(b) Collection by hands.

The number of insects can be greatly reduced by collecting them by hands. With regard to the “moth bores”, this collection is effected by cutting out the “dead hearts” of the injured canes and then by collecting the eggs laid on the leaves. The fungus, which are susceptible to lights, are killed by exposing them to lights in the cane fields. Washes are also used to reduce the infection.

(ii) Biological methods.

The most efficient way of combating the pests is “parasitization” i.e, by introducing and encouraging the growth of parasites or natural enemies of the pests. These introduced “enemies” will fight and then kill the injurious insects. To achieve this object, life histories of the insects including their natural enemies have to be very carefully studied and classified. In America and Hawaii, where artificial methods of control have

been found to be unsatisfactory, introduction of natural enemies has considerably reduced the chances of attack by pests. In Canada, a practical laboratory has been established at an outlay of Rs. 2,50,000 to carry out research works on the problems of parasitisation.

It must be admitted that this important problem of pests and diseases in cane crop has not yet received due importance in India. The Central Government, as well as the various Provincial Governments—not to speak of the mill-owners—are still indifferent to this aspect of serious damages caused to the crop by various infestations. If proper attention is bestowed upon this problem and preventive measures are devised to eradicate this evil—the yield of cane per acre is bound to show an appreciable increase to the great benefit of the cultivators. In a masterly note, submitted before the eighth meeting of the Imperial Council of Agricultural Research held at Simla on 8th and 9th July, 1936, on the scheme of research works on insect and pests of sugar-cane in India, Mr. Isaac, Second Imperial Entomologist, made the following weighty recommendations :—

- (a) For experiments in biological control and for observation of the susceptibility of cane to insect enemies—the cane-growing tracts of India should be divided into the following zoo-geographical areas :—

The Bengal-Bihar area, the Punjab-United Provinces area and the West Coast and South Indian areas.

- (b) Search for beneficial creatures that in this and other countries prey on Indian sugarcane pests and well as on allied insects so that natural enemies could be introduced in India.
- (c) Methods of breeding parasites and their artificial distribution must be thoroughly investigated.
- (d) Means for safe and quick transfer of the collected parasites, in suitable cages, from the rearing

- places to the distribution centres, are to be devised.
- (e) Special laboratories for this work are to be established.
 - (f) A Central Research Station with a parasite laboratory at Poona and facilities for observation and experiments at Pusa, Karnal and Coimbatore is to be provided.

It is expected that the Government of India will give their best consideration to the recommendations of Mr. Isaac. Ratooning, as stated earlier, has been very strongly suspected as one of the main factors for infestation of cane crop. It has been held that ratooning exhausts the soil of its plant food and cane, grown on such improvised soil, is bound to be unhealthy and so susceptible to attack by pests and diseases. It is well known that ratooning consists of allowing the stools of the original plant crop to strike again after the crop has been harvested and to grow into a cane crop for the succeeding year. This process may be repeated upto 4th and 5th ratoons, and it will be surprising to note that in Cuba certain lands have been known to hold ratoons for 14 and 15 years. The relative advantages and disadvantages of ratooning have been discussed in thread-bare in the eighth meeting of the Sugar Committee held at Simla in July of 1936 and we take the liberty of quoting *in extenso* from the said proceedings.

Advantages.

1. In all places where labour is very expensive or very scarce, ratooning is usually practiced, because the cost of labour bulks so high on the plant crop that the saving on a ratoon crop easily offsets the loss of tonnage.
2. When cane is being newly introduced into a district or

area and seed has to be railed long distances, ratoons represent a heavy saving and enable a larger area to be handled.

3. In all jungle tracts or on land newly reclaimed from forest, where excess nitrogen is usually present and the humus content is very high, ratooning usually pays, as in such places, it is possible to give the ratoons the best possible start. This is and has been the case in Cuba.

4. Ratoon cane is earlier ripening than plant cane and so gives the factory a chance of an earlier start if it is working solely on mid-season varieties.

5. In case of frost, where it is necessary to pit seed cane at considerable cost or where a lot of seed cane in the standing crop may be damaged, ratoons will be kept and the practice in the Punjab is traceable to this.

6. In cases where the plant crop, though heavily manured, has failed to grow through lack of moisture, in such cases, a ratoon will use up the manure and probably produce an excellent crop.

In short, the advantages may be summed up as saving in seed, labour, and manure, which in certain areas show a definite profit over the loss in tonnage.

Disadvantages.

1. Ratooning means that a heavy feeding crop is taken for two years running on the same soil, and such treatment usually means that the land under normal treatment cannot carry heavy feeding crop again for a period of years and the effect of rotation is lost.

2. Insects, pests, rats and all known cane disease are carried on and multiplied by the ratoons which also serve

as harbours for disease to affect the neighbouring plant cane.

3. A general deterioration of the cane crop grown out of ratoons is to be observed.

4. It is almost impossible to manure ratoons properly : bulk manure brings white ants if applied straight to the stools, while all artificials applied have to work in a soil depleted of humus and therefore results are usually unfavourable.

The Imperial Council of Agricultural Research in their circular of 28th November, 1935, invited the various Agricultural Departments in British India and Indian States and the various Indian factories to express their respective opinion regarding the merits and demerits of ratooning. Besides the Agricultural Departments of India and the Indian States, over fifty factories submitted their views. The general opinion of the Directors of Agriculture was that while first ratoons might not be harmful, the subsequent ratoons were liable to increase the incidence of pests and diseases. The replies from the various sugar factories endorsed the said views of Directors. The general conclusion, therefore, seems to be that first ratoons are not harmful provided the cultivation and manuring are adequate and that rigorous selection of healthy seed is practised but subsequent ratoons should never be encouraged. The Government of Mysore were of opinion that with good cultivation and an application of 5 to 7 cwts. of ammonium sulphate and 3 tins of compost per acre, it had been found that a satisfactory crop of 30 to 35 tons of cane per acre could be obtained. To keep down the ravages of the borer pest in ratoon cane, growing of sunhemp between the rows has been found to be very effective. The Bengal Agricultural Department is strongly against ratooning after the first crop as cases have occurred in the Province where the cane has simply died out partly through disease, but chiefly through soil exhaustion.

In November of 1936, the Sugar Committee considered the views of the Departments of Agriculture in the Provinces

and constituent Indian States and of factory owners on the relative advantages and dis-advantages of ratooning. They have decided for the appointment of a Special Technical Sub-Committee to work out the details of an experimental scheme in order to get accurate information as to the effect of ratooning on the incidence of insect and pests. This is a right move in the right direction and the Industry will certainly endorse the appointment of the said Committee. But we are not aware of any serious attempt, made by the Government of India through the Imperial Council of Agricultural Research, to estimate the monetary loss resulting out of the damages caused to the cane crop by pests and diseases. It will be admitted that such an investigation should have been undertaken long ago for the benefit of the Industry. The only notable contribution in this direction is a Note dated the 27th of April, 1937 submitted by Dr. Haldane, Ph. D., F. I. C, Chief Chemist, Messrs Begg Sutherland & Co, Ltd. to the Imperial Council of Agricultural Research. The Note embodies the experimental results of a survey on the conditions of the sugarcane crop in Bihar with reference to borer infestation. The survey was made primarily over the supplies of cane delivered during the month of February 1937 to ten factories—the operations of which are controlled by Messrs. Begg Sutherland & Co. Ltd. The following figures will clearly demonstrate as to what extent the pests and insects deteriorate the quality of sound canes :—

	<i>Brix</i>	<i>Purity</i>	<i>Sugar per cent</i>	<i>Yield</i>
Sound canes	19'45	86'77	12'76	10'71
Infested canes	16'21	78'94	9'23	7'10

The fall in percentage of sugar and yield is quite appreciable and these factors finally tell upon the percentage of recovery—thus increasing the cost of production. The Indian factories are quite unmindful of this awful drainage of sugar and they pay no attention to eradicate this evil of infestation. In determining the monetary loss sustained by the said ten

factories of M's. Begg Sutherland & Co. Ltd. due to borer infestation, Dr. Haldane says that apart from the excessive loss to the miller, the question has a national aspect in so far as the Excise and Imperial revenues suffer from depleted yield. He then summarises, with precision, the monetary loss resulting out of this infestation :—

1. The estimated loss of sugar due to borer and disease by the group of ten factories during the month of February is estimated at 59,359 maunds, or a financial loss of about Rs. 3,50,000 per month--taking the price of sugar at Rs 6/- a maund. For a season of five months, duration, this loss may be estimated at Rs. 17,50,000.
2. It has been stated above that the financial loss sustained by the said ten factories is Rs. 17,50,000 for the season. Taking the Sugar Excise Duty @ Re. 1-8-0 a md., the revenue loss to the Government of India would approximate to about Rs. 4,30,000.
3. Since there are 65 factories operating in North Bihar and Eastern United Provinces and assuming that the quality of cane milled by the group of the said ten factories is representative of the supplies to all factories, the total revenue loss to the Government of India on Sugar Excise for the said season may be estimated at about Rs. 28,00,000.

This loss of central revenue will be much more swelled up when we consider the fact that the cane crop all over India is more or less diseased and that over 140 factories worked in the said season.

Dr. Haldane further remarks that this uncontrolled infestation of the standing crop of cane constitutes a severe menace to

the stability of the Sugar Industry. It is, therefore, apparent that it is of utmost importance that the Provincial Agricultural Departments offer immediate assistance to check, reduce or eradicate this infestation. Dr. Haldane further suggests that a portion of the Sugar Excise Duty should be spent to combat this evil and an investment, in this direction, will not only benefit the Industry but will, at the same time, increase the Industry's contribution to the Imperial revenue.

We must remember that the damages caused to the cane crop by pests and diseases is extensive and so immediate attention must be focussed to this important problem. There must be co-operation between the Industry and the Local Governments to devise all possible means with a view to combat the evil effects of infestation.

Transport.

Quick transport of canes from fields to the factories is a very important factor in the manufacture of sugar. Because, delay in transit will cause dryage of canes which, in turn, will adversely affect the purity of juice with the consequent fall in sucrose content. Moreover, fresh canes are easily crushable and exert less strain on the milling plant. On the contrary, dry canes, for easy crushing, require more maceration water with the result that consumption of fuel goes high thus increasing the cost of manufacture. Therefore, the aim of every factory should be to secure the canes as fresh as possible.

The methods, as usually adopted for transport, are as follows :—

1. Animal power on roads, e.g. bullock or buffalo driven carts.
2. Mechanical traction on roads.

Where the conditions of road permit, the traction engines of caterpillar type have been found to give very good results.

3. Light Railway system.

There is no doubt that the most important, efficient and quick means of transport is a system of Railways. Apart from the public or state-owned railways, the factories generally adopt a gauge system which lies between 2 to 3 feet. It has been held that "a locomotive weighing approximately 15 tons will haul, at a rate of 10 to 50 miles per hour, twelve to fifteen wagons, each holding about 3 tons of cane" (Noel Deer, Page 177.)

4. Tramways system.

This method of transport is also efficient and quick. Generally, a system of 2 feet gauge with rails weighing 14 lbs. per yard is adopted.

5. Water carriage.

In those areas, where factories are located being surrounded by water-ways or rivulets, this form of transport is very cheap. This system is employed in certain parts of Louisiana and Australia. In India, this method is extensively used in Bengal.

6. Aerial ropeways.

In hilly tracts, this method is practically the only means of transport. It has found some use in Mauritius. The capital outlay for this system is expensive and factories of very high tonnage should go for it,

In India, carts drawn either by bullocks or buffaloes are extensively used for gate canes and Railway system for distant canes. A very small number of factories have got their own light Railway or tramway system for the transport of canes. In Bihar and U. P., where there has been a congestion of factories and where until recently there was no zoning system, factories would generally secure the gate canes from their

neighbourhood and later on, from distant places through Railways with the result that the purity of juice would deteriorate with consequent loss of sugar. Moreover, the carrying capacity of an average bullock cart in India is hopelessly small. This means that the conveyance charges per maund of cane transported will naturally go higher which is detrimental to the interests of a factory. In some places of U. P. and Bihar, some improvement in the efficiency of a cart has been effected by the introduction of pneumatic-tyred bullock carts. The advantages, which these type of carts (specially of Dunlop make) possess over the ordinary bullock carts, may be summarised as follows :—

- (i) The low centre of gravity increases the stability of the cart (pneumatic type) over uneven surfaces.
- (ii) The pneumatic tyres absorb a great deal of the shock which is transmitted to the entire body of the cart thus sparing the bullocks the jolts and jarks that they would ordinarily sustain.
- (iii) The low loading level and the width of the cart makes loading in the fields and unloading at the carrier much easier and quicker.
- (iv) The average capacity of a pneumatic tyred cart is 40 to 50 mds. while that of an ordinary cart is only 15/20 mds.
- (v) The work on cultivated, water-logged or sandy ground becomes much easier due to the large spread of the types.
- (vi) Least damages are caused to the roads by these type of improved carts.

But it must be admitted that mechanized forms of transport should be adopted, if this problem of transport of canes in India, is to be solved satisfactorily. It is a happy sign, no doubt, that some Indian factories have already realised this difficulty and are trying to introduce light Railway or tramway

system to secure their supplies. In Meerut District, a thirty miles long, steam driven tramway has been introduced as an experimental measure. It is expected that if this experiment really succeeds, the transport charges for cane shall not be more than $\frac{1}{2}$ a pie per maund per mile. The Rhotas Sugar Mills Limited in Bihar have already erected an aerial ropeway system for the transport of their canes. It carries 70 tons of canes per hour. The overall length of the ropeway is 666 yds. and is 18 ft. above the ground level.

This transport difficulty is very serious, specially, in Bengal. It is understood that the Representatives of the Bengal factories have very strongly urged this point before the last Tariff Board. The seriousness of this problem there will be evident from the fact that about -/3/- to -/2/6 per md. is to be paid as conveyance charges for canes to be transported from an average distance of ten miles only. It will be quite surprising to note that canes from the fields have often to be brought to the different purchasing centres of the factories some time by carts and also by coolies on their heads. It is then transhipped to the country boats which convey it to the factory-ghat from where it is again unloaded and then delivered to the cane carrier. The conveyance charges for this circuitous transport can now better be imagined! This difficulty of communication and absence of cartable and feeder roads in Bengal stands on the way of prolonging the season beyond March every year, although, sufficient canes then remain at the fields at the great distress of the cultivators. The Representatives of the Bengal factories have definitely stressed it before the Tariff Board that unless and until the transport problem in Bengal is solved, this Industry can never be stabilised in that Province. In a Memorandum submitted before the Government of Bengal in June, 1937, a deputation of the Bengal Mill Owners led great stress on this point. The attention of the Government of Bengal is specially invited to this direction.

The nature of unsatisfactory conditions of transport of

canes in India was also discussed at a Meeting of the Sugar Committee of the Imperial Council of Agricultural Research, held at Simla in July, 1935. The Committee passed a very important Resolution regarding this matter, a portion of which runs as follows :—

“In the interests of the sugarcane growers in the interior and of the sugar factories, better facilities for the transport of canes should be provided by the Local Governments and the Local Bodies—such facilities of acquisition of land, construction of culverts should be given to the factories which are willing to undertake such provisions.”

The Government have also a duty to help the Industry to create better facilities for transport. The Central Government should allocate more funds to the Provincial Governments out of the sugar Excise Duty. The Government of India should remember that their total revenue receipts from this Duty is now about four crores of rupees and they have not hesitated to realise this Duty from the Industry even at its worst days. The Industry is, therefore, quite justified if it demands more funds from sugar Excise Duty for its improvement. Moreover, in allocating funds to the different Provincial Governments, the Government of India should give complete discretion to the Local Governments to utilise this subsidy according to the requirements of the Industry in their respective jurisdictions.

But the different Provincial Governments are really the competent authorities who can deal with the problem of transport in their respective areas with more details and thoroughness. The Local Government of any Province, should first of all, make a detailed survey regarding the transport arrangements of canes to the factories. They should, then, in consultation with the factories draw up schemes to provide better facilities for transport. The necessary funds required to execute these schemes may be secured from the subsidy out of the sugar

Excise Duty, allotted to the particular Government, or from any other fund at their disposal. It is quite natural to suppose that if the factories are called upon to contribute a certain share of this expenditure, they will gladly agree to such a proposal for their own benefit. What is, therefore, needed for the present is the proper initiative to be taken by the Local Governments in their respective Provinces.

In concluding our remarks on transport problems, it is to be emphasised that the purchase of raw materials at cheap and reasonable price is one of the best means calculated to stabilize this Industry and an appreciable reduction in conveyance charges is a preliminary step towards that direction.

Zoning system.

To secure an un-interrupted supply of raw materials for continuous and regular crushing is a very serious problem with most of the factories in India, specially, in U. P. & Bihar, where there has been a severe congestion of factories. In order to have an assured supply, they very often indulge in cut-throat and indiscriminate competition for the purchase of canes. This unhealthy competition un-necessarily raises the price of cane to the detriment to the interests of the factories. Moreover, the position of the grower also becomes compromising. In a year of under-production of cane, he gets a fair return for his yield but when there is over-production, he is completely left at the mercy of the factories. He does not, therefore, derive any incentive for proper and improved cultivation as the problem of un-certainty of sale always hangs upon him. On the other hand, for want of well-defined assigned areas, the mill-owners are also confronted with the problem of un-certainty of purchase and they, therefore, become extremely reluctant to spend money for improvement in cultivation on upto-date lines. In our opinion, this chaotic condition in the supply of raw materials is one

of the most important reasons for which no systematic programme to improve the present standard of cultivation has so long been undertaken either by the growers or by the factories. As a result, the average yield of cane per acre in India and the percentage of sucrose in it has remained very low.

It has been stated previously that unless India makes tremendous progress to improve the present quality of cane, this Industry can never expect to attain that degree of stability and perfection which will be essential for it to stand on its own legs when the present form of protection will be lifted in near future. It is most regrettable that since 1932, when the protection was granted, no appreciable progress in this direction has been effected either by the Industry or by the Government. The only means by which, the above difficulties can be satisfactorily solved, is to assign to each factory a well-defined zone from which alone it can draw its supply. By adopting this system of zoning, the factories will be highly encouraged to take all possible measures to raise the standard of cultivation of cane in their respective zones, whereas, the growers will also be relieved of the fear of un-certainty of sale. In other words, the mill-owners as well as the cultivators will be bound to each other by definite obligations.

The matter was also discussed by the Sugar Committee of the Imperial Council of Agricultural Research at their meeting held at Simla in May, 1937. The Committee favoured the principle of drawing 75 p.c. of the requirements of a factory from an assigned zone and the remaining 25 p.c. from un-assigned areas.

This idea of assigning definite areas to each of the factories was discussed as early as 1935 by the Indian Sugar Mills Association at their third annual meeting—when the question of allotting a well-defined home-station to each factory was thoroughly considered in great details. It was decided that each factory would be allotted a definite home-station from

where no other factory should be able to draw its supply. A good feature of this scheme was that the Railway authorities pledged themselves to assist in this matter by regulating the booking of cane from home-stations to the factories. Booking of cane by a factory from a home-station—not belonging to it—was not allowed at all. But, this scheme fell through for want of sincere co-operation amongst the factories. The idea of enforcing any such arrangement by proper legislation was being felt from this time. This important question was also taken up in the U. P. Conference which was held at Nainital in June, 1937. The Representatives of the cane-growers were also present at the said Conference. The conclusions, arrived at, may be summarised as follows :—

- (i) In any scheme of zoning, the interests of the growers must be amply safeguarded.
- (ii) The factories must undertake to purchase the entire cane from their respective zones but the growers shall be at their liberty to convert some portion of their crops, if they so like, into “gur.”
- (iii) The District authorities shall be empowered to allow a factory to purchase its cane from a zone, not assigned to it, in special circumstances.
- (iv) In fixing a zone, regard must be had to the principle of rotation of crop and the capacity for increase in cane area within the zone.
- (v) A scheme, for this system of zoning, is to be prepared in consultation with the Indian Council of Agricultural Research, the Government of Bihar and the Rampur State, which is to be submitted later on, before a small Conference for further examination.
- (vi) A draft bill is then to be prepared to give effect to the decisions of this small Conference.

The subject of zoning loomed large before the joint Sugar Cane Conference, convened by the Governments of U. P. and Bihar and which was held at Lucknow in September, 29 and 30, 1937. It was emphasised in the Conference that zoning must be accompanied by licensing and the growers must be bound to supply canes to the factories through proper agreements. The Conference was ultimately in favour of zoning in principle and decided to appoint a sub-committee to examine the matter in details and to formulate concrete proposals which would be generally acceptable. The necessity of enacting proper legislations for enforcing the system of zoning was also agreed by the Conference.

Two important generalisations emerge out from the above proceedings and discussions :—

- (i) Interests of the growers must amply be preserved in any system of zoning.
- (ii) Proper legislations for enforcing zoning are to be enacted.

With the concurrence of the Industry and the cane growers, the Governments of U. P. & Bihar have already passed the necessary legislations regarding zoning and other allied matters by virtue of which, the Industry, in those two provinces, has practically been *nationalised* to the relief of all concerned. The details of those enactments have been discussed in a different chapter of this book.

The advantages, which will result from zoning, may be summarised as follows :—

- (i) The production and supply of cane to the factories will be regulated and chances of alternate under-production and over-production will be greatly eliminated.

- (ii) The factories will, certainly, try their level best to adopt all possible means to improve the quality of cane in their respective zones and naturally the present standard of cultivation will be raised to the mutual benefit of the Industry and the growers.
- (iii) The principle of starting co-operative organizations amongst the growers will receive a strong impetus.
- (iv) Cultivation of cane will be concentrated in the neighbourhood of the factories. This will minimise the costs of transport to the great relief of the factories.
- (v) Uncertainty of sale on the part of the growers and the uncertainty of purchase on the part of the factories will no longer hang upon the either party.
- (vi) The factories will be able to establish direct contact with the growers thus excluding the "middle men" to the benefit of the growers.

Minimum price of canes.

The payment of price of canes on fair and equitable basis is the surest means to secure uninterrupted supply from the growers. This payment should be adjusted in such a way that the interests of the factories as well as of the cultivators are equally safeguarded. It should be remembered that the growers will certainly receive impetus for cultivation provided they are paid reasonable price for their canes. In India, this problem is very complex in nature due to the reason that almost all factories are to depend for their supply on the cultivators

who possess small holdings of lands. Before we discuss the various aspects of this problem in India, it will be of interest to deal briefly the various modes of payment that were and are still being followed in advanced sugar producing countries of the world.

JAVA :—As has been stated in a previous chapter, the sugar factories in Java do not usually buy their canes from the growers. Almost all of their supplies are drawn from their own plantations arranged on lands secured on "lease" system. But there are large cane estates which do not possess any factory but exclusively grow canes for factory consumption. The supply from such estates is regulated and controlled by agreements entered into between a factory and the estate. The profit or loss accrued from the canes supplied by an estate is shared equally by both the parties.

The profit or loss is arrived at in the following manner :—

"The Cane Estate computes the total expenses incurred in producing and delivering its canes on the weigh bridge of the Mill. The Mill, in its turn, calculates the total costs of manufacture, packing, sale and delivery of the sugar made from the cane derived from the Cane Estate."

From these data and others, they find :—

Costs of cane delivered by Cane Estate.....	
Costs of manufacture of sugar therefrom.....	
Total costs of sugar produced from cane supplied by Cane Estate .....	.....
Proceeds from the sale of this sugar .....	.....
Profit or loss is the difference	(Maxwell—p 61)

It will be observed that the question of fixing any minimum price for cane does not arise at all in Java due to the very ideal system followed in adjusting the cane prices.

MAURITIUS :—"The most usual basis is that by which a planter gets two-thirds of the extraction of the mill in kilos of sugar per ton of cane which he delivers. Thus, if the mill takes ten tons of cane to make one ton of sugar, the extraction is ten per cent. ; the planter gets two-thirds of 100 kilos, or 66 kilos of sugar for every ton of cane he delivers. This is based on the actual results of the mill." (South African Sugar Journal, March, 1922).

It is to be noted that the price of cane paid to the planters is very high as they get two-third of sugar produced from their cane.

HAWAIIAN ISLANDS :—The major portion of the cane is raised by distinct and highly organised plantation companies. The payment is made on the basis of \$1 to \$1.20 per ton of cane from every cent per lb. of 96° sugar quoted in New York for the month during which the cane is delivered. The payment is made on the said basis subject to the quality of cane, the rate for which has been fixed to 8 tons of cane to 1 ton of sugar.

The most remarkable feature of this system is that the payment is made strictly on the basis of quality. This practice gives very good inducement to the growers to raise the standard as well as the quality of cane.

CUBA :—The major portion of the cane is grown by the planters and the factories secure their supplies from them through proper agreements. The planter receives about half the value of the sugar produced in return for the canes at the fields, and the mill has to pay for transportation charges, all manufacturing expenses, the transport charges of sugar and other incidental charges out of the other half.

In India, the idea of controlling the price of cane with a view to safeguard the interests of the growers took a definite shape when the Sugar Cane Act was passed by the Indian Legislatures in 1934. The main provisions of this Act may be summarized as follows :—

- (a) The local Government may declare any area to be a controlled area for the purposes of enforcing the provisions of this Act in that specified area.
- (b) Subject to the control of the Governor-General-in-Council, the local Government may fix a minimum price for the purchase of sugarcane to be used for factories in any controlled area.
- (c) The Local Government may prohibit in any controlled area the purchase of sugarcane intended for use in any factory otherwise than from the growers of the sugarcane or from a person licensed by the local Government to act as a purchasing agent.

The Governments of U. P. and Bihar were the foremost in India to enforce the provisions of this Act to regulate the price of cane and to fix a minimum price to be paid for it in their respective jurisdictions. Rules were framed under the provisions of this Act and enforced from the crop season 1934-35. In both the Provinces, the minimum price of cane was fixed to the basic rate of -/5/- per maund and was linked with the basis price of sugar which was at that time fixed at between Rs. 8/- to Rs. 8/12/- per maund on the basis of F. O. R. mill delivery. It was further stipulated that this minimum price of cane was to vary with the price of sugar on the basis of a sliding scale. The main object of these two Governments to enforce this Act was to eliminate the question of middle men as far as possible and to see that the growers could secure a fair and reasonable price for their canes.

But the experiences of the working of the different provisions of this Act for the season 1934-35 in those two Provinces proved conclusively that important changes should be introduced at the earliest opportunities if real relief was to be rendered to

the growers and the factories as well. The defects, which were noticable in the operations of the Act, at that time, might be summarized as follows :—

- (i) The very principle of fixing the minimum price on the basis of flat weight only without having any regard for the quality proved detrimental to the interests of the factories. The mill-owners were forced to pay the same rate for bad as well as for good quality of cane. This system naturally did not furnish any incentive to the growers to improve the standard of cultivation and the quality of cane.
- (ii) The factories had to pay the same rate for the gate canes as well as for out-station canes irrespective of the distances from the factories. No provision was made to deduct any transport charges or to compensate for the loss in sucrose due to dryage from the price of canes. The result was that the mill-owners were reluctant to secure supplies from distant places. The duration of the season was consequently shortened.
- (iii) In fixing the minimum price, the local conditions, surrounding the factories, were not taken into consideration.
- (iv) In the absence of any good marketing scheme for sugar, no proper and systematic method to regulate its price was devised so that the principle of varying the minimum price according to the price of sugar obtained could not be given a fair trial.

It will now appear that the Rules made under this Act were framed with a view to safe-guard the interests of the growers only but no consideration was given for the interests of the factories. This mistake was soon rectified and the Government of U. P. made suitable changes in the Rules regarding the

deduction of transport charges from the minimum price of cane. The Government also agreed to the suggestion of the Industry to the effect that the minimum price is to remain at -5/- a maund from the beginning of the season upto 15th of December in every crop year, after which, the price will vary according to the sliding scale for the price of sugar obtained. To discuss this problem in more details, a Conference was called at Lucknow in December of 1935 by the Government of U. P. where the principle of fixing the minimum price on quality basis was discussed in threadbare. The consideration of this suggestion was, however, postponed for the next year.

The difficulties experienced by the factories as to the proper working of the Rules framed under this Act were not completely removed. Conferences, at the initiative of the Government of U. P. as well as that of Bihar, and also under the joint auspices of these two Governments, were convened from time to time to arrive at agreed solutions regarding the different suggestions of fixing the minimum price of cane. One such Conference was called by the Government of U. P. in July of 1936 and another in June of 1937. The Bihar Sugarcane Conference was also convened by the Bihar Government in September of 1936. The different aspects of this Industry were discussed in those Conferences and the question of fixing a minimum price on a fair and equitable basis was given the due importance it deserved. The suggestion for fixing the minimum price on quality basis did not find favour for the reasons that practical difficulties would crop up to determine the quality of cane. In the Conferences held in 1936, it was suggested that the minimum price for cane should be fixed on a sliding scale depending on the maturity of cane. But the Representatives of the Industry opposed this idea on the following grounds :--

- (i) No cane will then be available during the early part or middle of the season as the growers will

naturally wait for the full maturity to secure the maximum price.

- (ii) Here also the same difficulties will be experienced in determining the sucrose content of each lot of cane.

Besides the problem of fixing the minimum price, two other questions of vital importance affecting this Industry were also discussed at the said Conferences. One is the formation of a net-work of Co operative Societies amongst the growers and the other to assign well defined zones to different factories. As has been stated previously, the formation of these Societies was urged for the elimination of middle men and to have direct contact with the cultivators. It was also agreed that these Co-operative Societies would try to raise the standard of cultivation of cane and to devise ways and means to safeguard the interests of the growers. The question of zoning has already been discussed in details in the previous pages.

An interesting suggestion was also made at the said Conference whether it was possible to link the minimum price of cane with its cost of production. But this matter could not be discussed in details for want of reliable statistics regarding the cost of production. The Report of the Committee appointed by the Government of India in this respect is keenly awaited by the Industry. But it was pointed out in the said Conference that the cost of production is an extremaly variable factor and is dependent upon the local conditions to a very great extent. It cannot, therefore, form a good basis to fix the minimum price for cane. In the U. P. Conference of 1937, it was suggested whether it was possible to fix an absolute minimum price for cane beyond which it would not be decreased irrespective of the fall in the price of sugar. The mill-owners agreed to -/3½/- a maund as the absolute minimum while the growers insisted for 4as. a maund. The Conference, however, agreed to this minimum at -/3½/- a maund as had been done in Bihar.

At the Joint Sugarcane Conference, convened by the Governments of U. P. & Bihar and which was held at Lucknow on Sept. 29 & 30th in 1937 under the Presidentship of the Hon'ble Pandit Govinda Ballav Pant, the Premier of U. P., this question of fixing the minimum price on an equitable basis was discussed in details. The Conference, however, could not come to an agreed solution regarding this important problem. As regards the fixation of different rates for gate canes and rail-borne canes, it was found that opinion was equally divided, ten persons on behalf of the factories wanting a rate of 6 pies less for rail-borne cane and ten persons on behalf of the growers desiring the same rate for both. As regards the minimum price, it was found that 15 persons were in favour of 6 as. a maund and 13 against this figure.

It will be apparent from the above discussions that although Conferences, with the representatives of the Governments, the growers and the Industry have been convened from time to time and serious attempts have been made to devise a formula to fix the minimum price of cane on an equitable basis, no agreed solution, safeguarding all the interests concerned, has yet been found to be possible. In our opinion, this failure to evolve a good formula is to be ascribed to the attempt of linking the price of cane with that of sugar without making any marketing arrangements to regulate the price of the latter. It should be noted here that if the price of cane always varies with the price of sugar, the growers will be afraid of this uncertainty. On the other hand, if the price of cane is fixed to an absolute minimum irrespective of the price of sugar, the interests of the factories will be seriously jeopardized. This has been witnessed last year when severe depression overtook the Industry. With the gradual decline in the price of sugar, the Governments of U. P. & Bihar were forced to make continuous reductions in the price of cane. In U. P., the minimum price was reduced as low as -/3/- a maund and in Bihar to -/2 6 a maund. These prices could hardly cover up the costs of production of the growers

but the authorities were compelled to make these reductions so that the factories could utilise the standing canes as far as possible to give some relief to the growers. It was soon realised that the problem of marketing of sugar must be solved satisfactorily if the price of cane is to be linked with its price. This principle has been recognised by the Governments of U. P. & Bihar in passing the Sugar Factories Control Act for their respective areas. The system of licensing of factories has been introduced and one of the conditions of the license is that every factory must be a member of the Indian Sugar Syndicate Ltd. The functions and other details of this body will be discussed in subsequent pages. To place the question of fixing the minimum price of cane on a more sound basis, the following provisions have been made in the Sugar Factories Control Act as is now in force in the above two Provinces :

- (i) A wide latitude has been given to the Provincial Governments to vary the minimum price and to prescribe Rules to determine how the minimum price shall be calculated.
- (ii) The Provision has been made for the payment of an additional price in addition to the minimum price for special varieties of canes. This has been done to give inducement to the growers to grow the superior type of canes.

Amongst the other provinces in India, the Government of Madras in October, 1935, issued two Draft Notifications with a view to enforce the minimum price in certain areas. But due to the peculiar conditions of cane cultivation obtaining in Madras, the Government gave up the idea and cancelled the Notifications. In February of 1936, the Government of Bengal appointed a Committee with the Commissioner of the Presidency Division as Chairman to consider the desirability or otherwise of enforcing the provisions of the Sugar Cane Act of 1934

in that Province. But it is understood that the idea of the Government of Bengal has since been dropped. Amongst the Indian States, the Government of Mysore have framed suitable Rules and Orders to regulate the price of cane and to fix a minimum price to be paid for it.

In a different chapter, the various provisions of the Sugar Factories Control Act have been discussed at some length.

Before we close our discussions on the subject of raw materials, it will be of interest to note briefly the features of the different varieties of canes that are now grown in India and used for the manufacture of sugar. It is to be remembered that before making any selection for plantation out of these varieties, the conditions of the soil and climate must be the determining factors :—

Co. 213—This is the standard mid-season cane now grown practically all over India. It begins to ripen in the beginning of January and its average sucrose in the juice raises from 14 per cent to 19 per cent from January to March with purity from 85 to 90. The maximum sucrose content of Co. 213 was recorded at Patna in March with 19'27 per cent and 98'10 purity.

Co. 299—This is an early ripening variety. In the beginning of November, it gives about 13'0 per cent sucrose in early January. This is millable in November and December. The average purity in November is between 82 to 83 and it gradually rises to 85 to 86 in December.

Co. 313—It is a second early variety millable during December and January. It gives 14-16 per cent sucrose in early December and maintains good

richness in juice for about two months. In January, the sucrose content goes upto 17-19 per cent with over 90'0 purity.

Co. 331—It is distinctly a late variety millable in the last week of March and April, specially, in North Bihar. But, it behaves like a mid-season cane in South Bihar. The average sucrose content and purity in March is 14-16 per cent and 82 to 89 respectively. In April, the purity, however, drops down to 80.

Co. 210—It is a mid-season cane and is specially suitable for growing in water-logged and dry conditions. In the middle of January, the sucrose content varies from 13'10 per cent to 14'8 per cent with 86 purity and such condition is maintained till the beginning of March in most places.

Co. 281—It is an early ripener. By the middle of November, it gives 15'3 per cent sucrose with 85 purity while the corresponding figures for January are 16'58 per cent and 90'1.

Co. 285—It is under trial in Bihar but did very well at Gaya giving 15'54 per cent sucrose in early December and reaches the maximum 17'71 per cent sucrose with 88'10 purity in early February.

Co. 205—This cane is being disliked by the mills due to its high fibre content (about 20 per cent.)

Co. 214—This is still under trial in Bihar. It generally ripens early in November giving 14'7 per cent sucrose and this steadily rises to 18 per cent with about 87'0 purity early in February and favourably maintains this condition till March.

Co. 312—It is still under trial in Bihar.

Co. 421—This is yet under observation but with promising future. At Patna, it had as much as 17'30 per cent sucrose early in January which went upto 20'3 per cent in mid-February with purity varying from 98 to 95. The result of this trial is being keenly awaited.

Before we take up further discussions on other problems affecting this Industry, we believe that we have been able to make it quite clear to all those interested in the development of this Industry that if it is to be placed on a permanent stability, it must attain efficiency in all directions. But the most important aspect in which immediate improvement is called for is to raise the standard of cultivation of cane and to improve its quality. To achieve this end, well-conceived schemes of research works are to be initiated without any delay. It is most pleasing to note that the Government of India have gradually realised this aspect of the Industry and are ready to spend liberally over the different schemes of work calculated to place this Industry on sound and efficient footing. This will be evident from the fact that the Governing Body of the Imperial Council of Agricultural Research have approved of the following grants to carry out research works on the different problems of this Industry :—

- (i) Rs. 41,480/- to be extended for two years to continue the research works on mosaic and other diseases of sugarcane at the Imperial Institute of Agricultural Research.
- (ii) Rs. 1,24,200/- for three years for the continuation of the sugarcane research work in the Bombay-Deccan area.
- (iii) Rs. 84,500/- for three years for the extension of the research works on the sugarcane scheme in Bihar.

- (iv) Rs. 5000/- for sugarcane research at the Hyderabad State.
- (v) Rs. 15,000/- to carry out research works on the possibility of utilising bagasse for Paper & Board making at the Imperial Forest Research Institute at Derha-Dun.

We want to lay great emphasis on the fact that the Industry has also a clear duty in this respect. Without always depending on the Government grants, it should also focuss its attention and devise ways and means to effect improvements in the present quality of cane and to cut down its cost of production as far as possible.

The Process of Manufacture.

In the manufacture of white sugar from cane, either sulphitation or carbonation process is employed. The fundamental difference between the said two processes is that in the former case, sulphur dioxide happens to be an important clarifying agent while in the latter, carbon dioxide is employed in the process of clarification. The relative advantages and disadvantages between the said two processes may be summarized as follows :—

- (i) The percentage recovery of sugar is higher in carbonation process than in the sulphitation due to thorough clarification obtained by the former.
- (ii) Gummy and other collodial matters of juice are easily removed by the carbonation process.
- (iii) Carbonation sugar is superior in quality to that produced by sulphitation.

- (iv) The cost of production of sugar is higher in carbonatation than that in the suplitation process but that is probably counter-balanced by higher price secured by carbonatation sugar.

In India, most of the factories employ double sulphitation process for the manufacture of sugar. It has been stated previously that the history of the recent development of this Industry dates back only from 1932 when Protection was granted. Within this short period, the improvement which this Industry has attained in matter of percentage of recovery of sugar is certainly encouraging. This will be evident from the following table :—

Year.	Percentage of Recovery.		
1931-32	...	...	8·89
1932-33	...	...	8·66
1933-34	...	...	8·80
1934-35	...	...	8·80
1935-36	...	...	9·29
1936-37	...	...	9·50

It will be observed that the Industry has maintained a steady progress to secure the maximum quantity of sugar out of the cane. It will be interesting to note that in 1919-20, this percentage of recovery was as low as 6·85 per cent. But it must be admitted that in comparison with Java, there is yet much room for effecting improvement in extraction percentage by the Indian Industry. The following figures will illustrate our view point :—

Java.

Year	Extraction Percentage.		
1931	...	...	10·46
1932	...	...	11·16
1933	...	...	12·64
1934	...	...	12·35
1935	...	...	13·21
1936	...	...	13·32

The reasons for which the Indian Industry has so far failed to go up to the Java standard, in this respect, may be briefly put down as follows :—

- (i) Inferior quality of cane used by the Indian manufacturers.

This subject has already been discussed in details.

- (ii) Want of well-equipped laboratories, workshops and other upto-date apparatus absolutely essential for controlling the various operations during the course of manufacture.

There is much scope for immediate improvement in the above directions. It will be no exaggeration to state that most of the laboratories of Indian factories are ill-equipped. The proprietors of the mills do not at all understand the utility of such an important unit. As a result, the Chief Chemist is seriously handicapped in carrying out his works and so the operations in the Boiling House are not controlled to the highest degree of efficiency. The author himself knows the cases of few factories where the owners consider a well-equipped chemical laboratory as a 'matter of luxury.' Mr. Sanghi, a technologist of great repute and varied experience, once remarked "If the Chemist or the Engineer asks the proprietors to purchase certain instruments or to have automatic recorders or thinks like that for purposes of experiments, they do not get these things as they do not understand the value of these things themselves."

As is the case with the Manufacturing Department, the Engineering Departments of most of the Indian factories are also ill-equipped. When compared with the efficiency in this respect with that of other advanced sugar-producing countries, India lags far behind. One of the most common defects to be observed in factories in India is the consumption of fuel which is comparatively very high but curiously enough the manage-

ments of the factories do not usually pay much attention to this matter. Most of them, on the other hand, think that the consumption of coal and fuel, besides the bagasse, is quite natural. They forget that a good sugar factory must run on the bagasse only and an efficient one must produce extra bagasse. It may be argued that the defects in installation of the Power Plant, the quality of the fuel, temperature and quality of feed water, misuse of steam in the Boiling House are the reasons for which the consumption of fuel might go high. This may be the case but it should be admitted that these are the defects which require rectification for efficient running of a factory. In most of the Indian factories, this consumption might be reduced to a very great extent if the Engineer can make proper control of the Boilers by having watermeter, steammeter, draftmeter, pyrometer and other upto-date scientific appliances at his disposal. Given the facilities of these apparatus, the Engineer will then be in a position to calculate the steaming efficiency of his Boilers and to know whether the fault is with the Boilers or whether there is something wrong with the consumption of steam in the Boiling House. The proprietors of the factories consider the expenses of a few hundred rupees to purchase the said apparatus as wastage of money while they lose thousands of rupees due to high rate of fuel consumption. But, fortunately for the Industry, the owners of the factories are gradually realising the truth that the manufacture of sugar is a highly scientific process and requires the aid of upto-date scientific appliances for their efficient running. They must be more liberal in spending money for making the factories well-equipped from all points of view.

Another reason for which the percentage recovery figure in India has not gone upto expectation is lower percentage of extraction of juice. The average extraction in Indian factories is about 88 p. c. against 94 p. c. in Java. It has been estimated that if all the 150 factories, now working in India, could attain the Java extraction figure, India would have saved about 1.4

crore of rupees annually on the basis of the present market of sugar. This huge amount of over a crore of rupees is lost to India per annum only for low milling efficiency. The attention of the Industry is invited to this important aspect and it is expected that all possible improvements will be effected to save this huge drainage of money.

- (iii) Paucity of trained and experienced technological staff.

It has been remarked before that the manufacture of sugar is a highly scientific process. Naturally, to attain maximum efficiency, men of high academic qualifications with practical experience should be engaged. But most of the factories in India do not take sufficient care in selecting their superior staff. Before long, there was an idea amongst the Indian mill-owners that good Chief Chemists and Chief Engineers must be 'imported' from foreign countries. A Dutch man with meagre academic qualifications and with a bit of practical experience has been called upon to fill the post of a Chief Chemist or a Chief Engineer on a fat salary to the preference of highly qualified Indians. The author has come across of an example of a Dutch man who was employed as a Chief Chemist of a big sugar mill, but was ignorant of the ordinary principles of Chemistry. This person was drawing Rs. 800/- per month at that time but the entire works of the Boiling House were being successfully carried out by his assistant who was an M. Sc. in Chemistry and was drawing a salary of Rs. 100/- only per month. The author was convinced that he was the real expert in that factory while the Dutch man was being paid such a decent salary for nothing. The author has seen many factories which have employed Chinese as Panmen to the preference of Indians of good experience and qualifications. This attitude of inferiority complex for Indians of good merit and experience must be given up. Given chance and opportunities, Indians with

high academic qualifications are expected to give better results than the fat-salaried foreigners.

If the managements of the Indian factories change their outlook in the matter of appointment, the Industry is expected to produce first class experts whose merit can be well compared with that of good foreign technologists. We are of definite opinion that if Indians of good academic qualifications and experience were given the opportunities to control the operations from the very beginning of the development of this Industry instead of bringing so-called experts from the foreign countries, India could have progressed a little more in the matter of percentage recovery.

(iv) Absence of technological research.

In the chapter on 'Sugar Industry in Java', it has been pointed out how the research works on the different aspects of the Industry there are being controlled and inter-linked with one another through well-organised institutions. The Indian Industry can effect a lot of improvements towards developing and co-ordinating the research works on various technological problems amongst the Indian factories. Intensive research works on the technological problems will certainly yield good results, which when applied to actual operations in the factories, are bound to raise the percentage of recovery to some extent.

Those countries which have been able to build this Industry on sound footing have spent liberally on research works on technological problems. The State have always made substantial grants in this respect. Within the course of the last few years, the Japanese have developed their own Industry to such an extent that she is now independent of her sugar supply. It will be surprising to note that within a course of 16 years, the Japanese Government have spent Rs. 1½ crores for the cause of this Industry. The average expenditure on research

works in Japan is Rs. 3/- per acre of cane. The same amount is spent in Java while Hawaii spends about Rs. 12/- per acre on this item. In comparison with these countries, the Indian Government spend very little for sugar research works.

Until very recently, there was no arrangement through which systematic research work on technological problems could be undertaken in India. The formation of the Imperial Institute of Sugar Technology at Cawnpore has removed this want of the Industry. It is expected that under the able guidance of Mr R. C. Srivastava, B. Sc., O. B. E., this Institute will play a very important role in developing sugar research work in India to the benefit of the Industry. The Government of India have agreed to incur the expenses of this Institute to the extent of about Rs. 14 lakhs for a period of 5 years. The details and functions of this Institute have separately been dealt with in Appendix C. The different Provincial Governments should also consider the desirability of extending their patronage to stimulate sugar research works in their respective jurisdictions. The laboratories of the Industries Departments of the Provinces should be fully equipped with all appliances to carry out researches on sugar. If co-operation is maintained between the Government and the Industry, India will certainly make a head-way in developing her sugar research to the desired extent.

By-products.

Molasses and bagasse are the two principal by-products of the Industry. In a previous chapter, the question of utilising molasses in various directions has been discussed at length. But, before we deal with the problem of utilising the bagasse as a raw material for the manufacture of low-grade paper and card boards, it is desirable that some idea should be given as to make use of molasses for the production of Acetic Acid.

It is well known that about 90 p. c. of the world's production of artificial silk is now produced by the viscose and acetate process. In the former process, caustic soda, carbon di-sulphide and sulphuric acid happen to be the principal re-agents, but almost all of these have to be imported from foreign countries. On the contrary, in the acetate process, the important chemicals required are acetic acid, acetone and acetic anhydride. It is to be noted here that acetic acid is the starting material for the production of acetone and anhydride. The recent research works have shown that molasses can conveniently be used as a raw material for the manufacture of acetic acid by fermentation method. In a learned paper read before the Fifth Annual Convention of the Sugar Technologists' Association of India held at Cawnpore in 1936, Mr. K. C. Mukherji of the Industries Department of the U. P. Government has very elaborately discussed the cost of producing acetic acid from molasses and other cognate details regarding this problem. After discussing the relative advantages and disadvantages of the viscose and acetate process for producing artificial silk, he favours the idea that India can adopt the acetate process in developing the Rayon Industry by producing acetic acid from molasses which can now be had in abundance from the sugar factories. We, therefore, take the liberty

of giving the details of the cost of production of a lb. of acetic acid from Indian molasses from his paper.

Calculation of the Cost of Production of Acetic Acid (99-100 p. c.) for a factory producing 2,000 lbs. of Acid per day from fermentation of Molasses :—

Assumed yield = 300 lbs. of pure Acetic Acid per ton of molasses.

	Rs.	As.	P.
1 ton of molasses at Re. 0-4-0 per maund...	6	13	0
Fermentation charges (chemicals, water, aeration, etc)	3	8	0
Cost of steam for distilling the fermented wash and evaporation of the calcium acetate solution after neutralisation with lime at 10 lbs. steam per lb. of ca-acetate (545 lbs.) and Rs. 3/- per ton of steam	7	3	0
(Wash 1,100 gallons, distillate 1,000 gallons, crude ca-acetate formed 545 lbs. 80 p.c.)			
Cost of lime 163 lbs. at Re. 0-12-0 per maund	1	8	0
Cost of H_2SO_4 302 lbs. (95 p.c.) at Re. 0-1-6 per lb..	28	5	0
Cost of steam required for distilling out the acetic acid at 6 lbs. per lb. of acetic acid = $6 \times 3000 = 1,800$ lbs.	2	7	0
Cost of rectification at 0-0-2 pies per lb of acid... ..	3	2	0
Total cost of materials for 300 lbs of acid =	52	14	0
or	53	0	0
Cost of materials for 2,000 lbs. of acetic acid $53 = x \frac{20}{3} =$	35'3	5	0
Interest and amortisation charges per day on a capital of Rs. 60,000 at 15 p.c., working 3000 days in a year... ..	30	0	0
Overhead charges and labour per day...	40	0	0
Total cost of 2,000 lbs. of acetic acid =	423	5	0

Cost per lb. = 3.38 annas.

It will thus be observed that if the production of acetic acid from molasses is really found to be a sound commercial proposition, a very good out-let for its utilization will naturally be opened up. What, is therefore, required now is that more intensive research works should be undertaken at the Imperial Research Institute at Cawnpore to make this process a commercial success. It is needless to say that India imports a very large quantity of artificial silk and if molasses can be used as a raw material for the production of acetic acid on a commercial scale, a very good start can then be made for the development of the Rayon Industry in India by the acetate process.

Utilization of Bagasse.

The fibrous product, which remains after the cane has been crushed and exhausted of its juice as far as practicable, is known as bagasse. It is primarily composed of crude fibre, water together with a more or less amount of cane sugar and glucose. Though it is difficult to give an accurate composition of this material as it will vary according to the quality of cane, the following can be adopted as an average composition for purified cane fibre :—

Cellulose	55 p.c.
Xylose & Arabinose etc.	24 p.c.
Lignin	15 p.c.
Acetic Acid	6 p.c.

This acetic acid is formed due to fermentation and bacterial action on sugar present in bagasse. It will be noted, however, that dry bagasse contains over half of its weight of cellulose. It is for this cellulose content that bagasse has been

found to be utilised in the production of paper of low grade and card boards.

In India, bagasse is exclusively used as a fuel in sugar factories. Due to bad steam economy as is now prevalent in most of the Indian factories, there is hardly any factory which can run on bagasse only and produces surplus. It has been stated previously that a good factory should run on bagasse only, without using any other fuel, and an efficient one should have surplus bagasse. With the increased efficiency, it is expected that Indian factories should produce surplus bagasse at no distant date so that the question of utilising it other than as a fuel might be given a serious consideration. The reasons for which the Indian factories prefer to use it as a fuel may be summarized as follows :—

- (i) Production in abundance without incurring any extra cost.
- (ii) Readily available.
- (iii) High calorific value—dry bagasse gives as much as 8000—8300 B.T.U.

The question of utilising it for the production of card board and low grade paper was discussed by the Sugar Committee of the Imperial Council of Agricultural Research as early as 1933 and the Forest Research Institute at Dehra Dun was asked to carry out research works in this direction. It has been found possible, according to the authorities of the Institute, to produce a good quality of packing paper out of bagasse by mixing it with about 25p.c. of bamboo pulp. The production of this quality of paper, on a large and commercial scale, could not be experimented upon for want of equipment at the said Institute. But the following tables of import will show that there is a good market for card board and packing paper, etc. in India.

Packing Paper.		
Year	Quantity in 100 cwts.	Value in Rupees.
1932-33	324	4,53,500
1933-34	250	3,18,100
1934-35	313	3,81,700
1935-36	405	5,30,100
1936-37	364	4,80,500

Card Board, Mill Board Etc.

Year	Quantity in 100 cwts.	Value in Rupees.
1932-33	419	3,71,400
1933-34	417	2,77,200
1934-35	416	3,33,800
1935-36	496	3,65,600
1936-37	455	3,54,000

It is thus evident that India's import on the above two items goes over a few lakhs of rupees per annum although there seems to exist an opportunity for producing this card board and papers etc. out of bagasse. After prolonged and careful research, the Celotex Company in America have evolved a process by which the bagasse fibres are compressed into boards known as "celotex". These fibre boards are compact but porous and possess high sound and insulation properties. They are generally used in Council Chambers, Cinemas, Public Offices etc. The use of these fibre boards is increasing very rapidly as will be observed from the following figures of production of celotax :—

Year	Production (in sq. ft.)
1928	260,650 000
1929	333,225,000
1930	460,000,000

The average production of bagasse in some of the most important countries of the world is given below :—

Country.	Bagasse (in tons.)
Louisiana and Florida ...	250,000
Cuba	5,156,000
India	2,735,000
Java	2,939,000
Philippine	637,000
Australia	532,000
Formosa	815,000
Brazil	675,000

It will be observed that India stands third in respect of the production of bagasse in comparison with other countries, but as has been remarked before, almost the entire quantity of it is being utilised as a fuel in sugar factories.

Let us now discuss the possibilities of utilising this material for board making in India. The problems which require solution before a serious attempt can be made in this direction are as follows :—

(i) Whether sufficient quantity of bagasse can be readily secured at economic prices.

If bagasse can be made available for paper and board manufacture, it must be replaced either by wood or coal. To have a better understanding of this problem, the calorific values of the different fuels are given below :—

Fuel	Gross B.T.U. (per lb)
Coal	13,000-14,000
Air-dried wood (25p.c. moisture)	4,500-5,000
Dry bagasse	8,000-8,300

In heat value, $1\frac{1}{2}$ tons of bagasse is almost equivalent to one ton of coal. As the calorific value of wood is practically $\frac{1}{3}$ rd of that coal and as it is costly, coal seems to be a better substitute for bagasse if it is to be utilised

for board making. But there is a serious difficulty in substituting coal for bagasse in Indian factories. The Power Plants of almost all Indian factories are equipped with furnaces which are suitable for the burning of bagasse or a mixture of bagasse and wood. It is most unlikely that the owners of the factories will be willing to incur heavy expenditure for installation of coal furnaces in their existing Boilers. Even if some of the factories near the collieries might be agreeable to change their Boiler installations, it is extremely doubtful whether the factories far off from the coal fields will prefer the use of coal as a substitute for bagasse as a sound economic proposition. Moreover, the owners of the factories will not like the use of a fuel, the price of which might suffer great fluctuations. But in the case of bagasse, they are absolutely safe-guarded so far the market fluctuations are concerned. We, therefore, believe that most of the factories in India will not be agreeable to substitute their bagasse by coal on the above considerations.

(ii) Difficulties for storage and preservation.

For board and paper making, the cellulose content of the bagasse must not suffer deterioration to an appreciable extent. Considerable time is expected to elapse since the bagasse comes out of the Milling Plant and then transported to the board factories. But during the course of milling, the cells of the cellulose in the bagasse are burst and filled with air. The bagasse contains 50 p. c. water when it is being milled. Due to hot maceration used in milling, conditions for rapid growth of micro-organisms are therefore optimum. Within a few hours, the small amount of sugar present in bagasse starts to ferment and an odour of alcohol is noticed and within a course of few days, acetic acid is produced from this alcohol and the cellulose content is thereby seriously affected. It has been estimated that if the bagasse is left untreated to prevent this fermentation, the loss in fibre

has been found to go as far as 30 p. c. within a course of a few days. Most valuable works in preserving bagasse from being fermented by the use of certain chemicals have been carried out by Munroe and described in details in his original paper. (Ind. Eng. Chem. 30, 1934). Therefore, the question of storing and preserving this bagasse should satisfactorily be solved if it is to be utilised to develop the Board Making Industry in India.

From the above discussions on the different aspects of utilising bagasse for the manufacture of card board and paper, it will be observed that there are real difficulties for which this Industry cannot be started on a large scale by every factory unless the problem of having a substitute fuel for bagasse at cheap and economic prices is satisfactorily solved. We, therefore, suggest that as an experimental measure, a small beginning may be made by starting a Central Board Plant at a suitable place. The Indian Sugar Mill-owners should form a Limited liability Company amongst themselves to run this factory. Every member-factory will have to send a certain quota of bagasse to the Central Plant. The profit or loss, to be accrued out of this manufacture is to be divided pro rata amongst the members on the basis of the quantity of bagasse supplied to the Central Board Plant. Such a plant can be started, with manifold advantages, somewhere in the Bengal—Bihar border due to the presence of a number of coaleries.

Another latest utilization of bagasse which has been developed in the Philippine Islands is its use as a raw material in Glass Industry. Bagasse ash collected from sugar factories has been found to have a composition very closely resembling that of the mixtures of sand and alkalies—commonly used for glass-making. It has been held that the bagasse ash possesses the following advantages over the usual raw material, viz. sand :—

- (i) It is composed of nearly all the ingredients required for glass making in addition to silica.
- (ii) It is very easy to ground whereas sand resists fine grinding to the degree required for the purpose.
- (iii) Since bagasse ash is a silicate of a complex nature and has been fritted at high temperature of combustion in the furnace, the danger of the crystallization of molten mixtures containing these raw materials is considerably minimised.
- (iv) An emerald green of a pleasing colour may be produced from bagasse ash when the percentage of manganese in it is found to be appreciable.

The Bureau of Science in Manila has installed a commercial furnace for making bottles from bagasse ash under actual manufacturing conditions.

(Philippine Journal of Science 1936, **60**,
P. 125 133.)

The attention of the Research Section of the Imperial Institute of Sugar Technology at Cawnpore is invited to this important avenue for the utilization of bagasse ash.

It is pleasing to note that this question of utilization of bagasse is also drawing the closest attention of the Government of India. The Governing Body of the Imperial Council of Agricultural Research has sanctioned a sum of Rs. 15,000/- in their budget for 1936-37 to be spent on the research works on the utilization of bagasse for board and paper making at the Forest Research Institute at Dehra Dun.

Marketing of Sugar.

Scientific and even distribution of finished products of an Industry from producing areas to consuming centres constitutes an important step towards its stabilization. Good marketing arrangements of production help a long way to relieve the manufacturers of their stock gradually thus ensuring them a fair and reasonable price for their products. This is more true in the case of sugar, the manufacture of which is now carried out in almost all the Provinces and the market for which extends throughout the length and breadth of India. Until very recently, the Indian manufactures of sugar did not realise this important principle of marketing and so no serious attempt was made by them to start a Central Marketing Organization. It is true that the idea of forming a Central Sales Organization has been discussed and debated on ~~several~~ occasions but no definite and concrete move was taken to give it a practical shape. A Conference of the Sugar Mill-owners was convened as early as 1934 in Calcutta where this question of forming a common selling organization was very thoroughly discussed but no progress was made in giving it a real start for want of proper support from the manufacturers. This indifferent attitude of the manufacturers towards such an important project was due to the reason that there was no keen internal competition prevailing at that time and the production of Indian sugar was far below to meet the requirements. The price was naturally fair and reasonable and the Indian Mill-owners were apparently thinking that they would be able to sell their sugar at those fair prices for years to come. The leaders of the Industry, specially, Mr. M. P. Gandhi—an acknowledged authority on the problems of Indian Sugar Industry—sounded due warning as back as 1934 and invited the attention of the manufacturers to a common danger which they

had to face in the absence of a Central Sales Organization. As a result, a second Conference of the Mill-owners was held in Calcutta in August, 1936, and the formation of a Central Marketing Board was very thoroughly discussed but like the Conference of 1934, no appreciable progress to materialise the scheme was made.

With the rapid development of the Industry, the producers of sugar began to feel the advent of a cut-throat competition amongst themselves. Upto this time, the manufacturers used to sell their sugar through their own respective selling arrangements not scientifically conceived and were not directed to the ultimate interests of the Industry. The matter came to a pass during the crop season 1936-37 when India produced more sugar than her requirements and for want of good marketing arrangements, the price began to fall sharply and touched the level of cost of production. The following figures will show the extent to which the Industry was depressed for want of a common selling organization.

<i>Year</i>	<i>Price per md. of sugar.</i> <i>(F. O. B. mill delivery).</i>
1931	Rs. 10/10/-
1933	Rs. 8/5/-
1936	Rs. 6/12/-
1937 (June)	Rs. 5/14/-

It should be noted here that out of the price of Rs. 5/14/- a maund, the manufacturers had to pay an excise duty to the extent of Re. 1/8/- a md. From the meagre balance of Rs. 4/6/- a md., the Mill-owners had to pay for the cost of cane, the establishment charges, interest on working capital, depreciation, off-season expenses, etc. The Industry was on the verge of collapse and there were chaos and confusion in sugar trade. The Rules regulating the minimum price of cane in U. P. & Bihar had to be relaxed to a considerable extent and

the Governments of those two Provinces were forced to reduce the minimum price as low as -/2/6 a md. The growers were ruined but the manufacturers were not in a position to pay more than -/2/- to -/2/6- a md. for cane at a time when their sugar was selling at Rs. 4/6/- a md. ex-excise duty.

It is at this stage that the manufacturers fully realised the absolute necessity for a Central Marketing Board for the sale of sugar. They were convinced of the fact that the entire Industry would be dislocated if a united attempt was not made to sell their sugar through a common selling organization. The reasons for which the immediate formation of such an organization were advocated might be summarized as follows : --

- (i) To eliminate the wasteful and keen internal competition amongst the manufacturers by making all sales through a Central Body.
- (ii) To raise the price of sugar by scientifically distributing it throughout all consuming centres over all the year round.
- (iii) To negotiate and make arrangements with such countries like Afganistan, Ceylon, Nepal, Tibet etc for the sale of Indian sugar in those territories.
- (iv) To induce the Government of India to afford export facilities for Indian sugar.
- (v) To secure greater uniformity in the gradation of the different qualities of Indian sugar thus creating good facilities for successful sugar trade.

But the difficulties which are likely to stand on the way for forming a successful Marketing Board should also

be considered. The main obstacles for which the works of such a sales organization may suffer are as follows :—

(i) Absence of standardization.

There is no uniformity in the present qualities of Indian sugar. The factories produce so many varieties that it is impossible to negotiate for any sale without judging the samples. The prices for sugar are, therefore, to be quoted on the basis of qualities of individual factories. The sugar produced by the present factories differs in colour and grain even for the same quality of sugar, from factory to factory. The buyers and the sellers are to experience much difficulties to push the sales in distant markets without sending the samples. It will thus be recognised that quick transaction of sales can be effected if the quotations for sugar are fixed on definite specifications irrespective of the factories. The fixing of standard of sugar is, therefore, a condition precedent for the formation of an effective Central Sales Organization.

The Indian manufacturers soon realised this problem and a Conference of them was convened in Calcutta in 1934 under the auspices of the Indian Sugar Mills Association to devise ways and means to fix this standard of Indian sugar. This Conference set up a Special Sub-Committee under the Chairmanship of the Sugar Technologist to formulate concrete proposals for the standardization of Indian sugar. The recommendations of this Sub-Committee, with some modifications, were accepted by the mill-owners at a subsequent Conference held at Cawnpore in August, 1936, and the establishment of a Bureau of Sugar Standards was finally decided upon at this Conference. The works of this Bureau started from 1st. of March 1935. The main function of this Bureau is to

prepare and supply different standard sets of sugar to Indian factories with a view to secure uniformity in quality as far as possible. The Sugar Technologist prepared a series set of standards of sugar and supplied them to the factories and merchants from August, 1935.

- (ii) Absence of real co-operation amongst mill-owners to make the Marketing Board a success.

It is evident that if the manufacturers are not inspired with a genuine desire to lend their help and co-operation towards any such sales organisation—which will ultimately benefit them—it is doubtful whether any success can be achieved from such an attempt. This difficulty has, however, now been removed at least from the Provinces of U. P. and Bihar—where this Industry is concentrated—by the introduction of the Sugar Factories Control Act in those two areas. We propose to take up the discussion of the implications of the various provisions of this Act in subsequent pages.

- (iii) Lack of proper finance at the disposal of a Central Marketing Board.

To make an even distribution of sugar all throughout the year, it is essential that the factories will be asked to sell their sugar on the basis of monthly quota system. This means that they have to stock their sugar for gradual sales in future. Much capital will, therefore, be locked up and factories, financially weak, will have to face enormous difficulties. This is a problem which requires a very careful consideration before any sales organization of sugar is expected to control the market in an effective way.

(iv) Difficulties for storage.

Sufficient accomodation will naturally be required to stock sugar for a long time. Most of the factories in India have insufficient go-down arrangements so that it would be difficult for them to hold large amount of sugar at a time. This ware-housing problem should also be tackled in such a way that the manufacturers are not put to serious troubles for accomodating their stock.

The formation of the Indian Sugar
Syndicate Limited.

The depression which overtook the Industry in 1936 might be considered as a boon in disguise as the manufacturers began to be united to start a Syndicate to push their sale of sugar on a scientific basis. It is with this object in view that a Conference of the Indian Mill-owners was convened in March, 1937 when the formation of a Central Marketing Organization was finally decided upon and the Conference passed the following Resolution which should be considered as the starting point of the formation of the present Indian Sugar Syndicate Limited.

" Having taken note of the general desire amongst the manufacturers of sugar for the earliest establishment of a Central Sales Organization, with a view to stabilize the market, this meeting of representatives of factories in India resolves that a limited liability Company to be called 'The Indian Sugar Marketing Organization Limited' be registered with the Memorandum and Articles of Association as printed and placed before this meeting. "

The Conference also appointed a Sub-Committee to

go into the details and make suitable recommendations to complete the scheme. After about three months, the sugar Mill-owners held another meeting in June, 1937, when the final seal of approval was given and the Syndicate started its work with effect from the 1st of July, 1937. This Conference was of unanimous opinion that the formation of a Central Sales Organization was the only step by which the Industry might be saved from total collapse.

The utility for such an organization was universally recognised by the manufacturers present at this Conference. It was emphasised that a stage in the development of the Indian Sugar Industry had already been reached when there was no other alternative to the chaotic state of affairs in the sugar trade than for the manufacturers to combine in a common selling organization. In delivering the presidential address at the first General Meeting of the Indian Sugar Syndicate Limited, held at Calcutta, in August, 1937, Lala Karam Chand Thapar observed :—

“The Syndicate is not only of immediate benefit to the Sugar Industry, but its success will also set an example for other Indian industries to organise themselves and improve the whole national outlook. Indeed, this great experiment has got a very wider significance than is originally thought of and we must bear this wider significance in mind while taking any decision in the matter. The failure of this experiment will be disastrous not only for the Sugar Industry but will also have demoralising effect on our whole national economy.”

Before going into the details of the working of the Syndicate, we will be failing in our duty if we do not mention the names of those leaders of the Industry who are responsible for its formation. Raja Narayanlalji of the Harinagar Sugar Mills is the originator of

the present scheme which eventually led to the formation of the Syndicate. Mr. F. A. Sherwani of the Neoly Sugar Factory, inspite of his bad health, ran from place to place to explain the details of the scheme to the mill-owners. Mr. D. R. Narang of the Basti Sugar Mills Ltd., Sardar Kripal Singh of the Saraya Sugar Factory and Mr. M. Jaipuria of the Ganesh Sugar Mills Ltd. did much of the spade work at the Gorakhpur sides. Mr. D. P. Khaitan, an eminent industrial magnet of international repute, guided the deliberations of the Syndicate during its formative stages. Another distinguished person who has devoted his considerable time and energy to bring the Syndicate into real existence is Lala Karam Chand Thapar. During the earlier meetings of the Syndicate, he has worked from morning till late at night for successive days together to give the scheme a practical shape acceptable to the various schools of thought amongst the manufacturers. It is needless to state that there was considerable opposition from different groups of factories to this important scheme of marketing. But Mr. Thapar met the opposition in such a beautiful and convincing manner that ultimately he was able to win it over to his own side. But for his untiring zeal and energy, the formation of the Syndicate would have been nipped in the bud. Another distinguished person who organised the Bengal sides is Mr. B. D. Jalan of the North Bengal Sugar Mills Ltd. of Gopalpur. The Indian Sugar Industry will ever remain grateful to these promoters who have worked constantly, at the sacrifice of their most valuable time and energy, to start the Syndicate.

It has been stated above that the Syndicate was started from the 1st of July 1937. It had 95 factories as its members during that time and was started as an experimental measure to dispose of the unsold stock of the season 1936-37 only. The functions of the Syndicate may now be summarized as follows :—

- (i) To purchase the sugar from the member-factories at certain basic rates.
- (ii) To permit the members to sell their sugar on monthly quota basis out of the total unsold stock at selling prices to be periodically determined by the Directorate of the Syndicate.
- (iii) To stop all forward sales without the previous approval of the Board.

This provision was made mandatory upon all members just to regulate the future sales of sugar at Syndicate's quotas and prices. Great stress was given upon the observance of this provision by all members.

- (iv) It has also been provided that the difference between the selling and the basic rate will be credited to the Syndicate for its financial footing and stability. It was further stipulated that the profit or loss accrued to the Syndicate will be distributed pro rata amongst the members according to the quantity of sugar purchased by the Syndicate from each member-factory.

Although the Syndicate was originally designed to handle the unsold stock of the season 1936-37, but inspired with the success achieved by it, the members in their meeting held at Lucknow in August of 1937, decided to continue its operations beyond the 1936-37 season. This decision of the members showed that there was a genuine and real desire on the part of the Industry to lend its all possible help to make this selling organization a great success. Really

speaking, the Syndicate achieved considerable success in toning the sugar market within a very brief period of four months since its formation. Taking stock of the measure of success it has attained, Lala Karamchand Thapar in his speech delivered at the meeting of the Indian Sugar Syndicate Ltd. held at Lucknow on the 11th of November 1937, observed as follows :—

“The formation of the Syndicate saved the morale of the Industry from the complete break down, immediately toned up the market and thus proved to be of benefit as a whole including those who preferred to sit on the fence and watch others to take the risk. The prices of sugar have veered round by about a Re. 1/- per md. which means a saving of about a crore of rupees to the Industry on the quantity of stock held by the factories at the time when the Syndicate was started.”

It will be observed from the speech that all factories did not join the Syndicate at that time thus hampering its successful operations. Due to lack of co-operation even amongst the members, the spirit of optimism which was visible during the formation of the Syndicate began to disappear away. A number of factories resigned their membership and doubts were, therefore, entertained in many quarters regarding the ultimate success of this sales organization. The reasons which brought this spirit of pessimism might be summarized as follows :—

- (i) Absence of co-operation amongst the members.

This was amply collaborated by the conduct of some of the members in not informing the Syndicate about their real position of stock and making forward sales in direct contravention of the Syndicate's directions.

- (ii) Invisible stocks in the hands of middle men which acted as a definite check towards the efforts of the Syndicate to control the market,

- (iii) Those members, who joined the Syndicate in July of 1937 but had no stock, did not evince active interest towards its working.
- (iv) The activities of the Syndicate were hampered due to large stock of sugar remaining with the non-members, who inspite of repeated persuasions, did not join the Syndicate.
- (v) Absence of co-operation on the part of the sugar merchants.

These merchants were labouring under a strong misapprehension that a successful Syndicate means the taking away of sugar trade from their hands. Although the Syndicate made their intentions quite plain regarding them on several occasions but they were not convinced about the ultimate motive of this organization.

Due to the said reasons, the function of the Syndicate was very seriously hampered with and the opposition to this bold scheme of marketing of sugar grew stronger. The arguments, put forward by this group, were as follows :—

- (i) The regulation of the distribution of sugar will raise its price with the result that consumption will decrease. At a time when India has produced more sugar than her requirements, any further fall in consumption will bring more serious complications.
- (ii) An appreciable increase in price of sugar will tempt the capitalists in Southern India, Bengal and Indian States to float new factories which

will be detrimental to the ultimate interests of this Industry.

- (iii) If undue restrictions are put on the sales of weaker factories by the Syndicate, these are bound to go to the wall.
- (iv) There is no arrangement in the scheme of the Syndicate to dispose of surplus sugar at the end of the season. This surplus stock will naturally glut the market and will again depress the entire sugar trade.

The groups which opposed the Syndicate scheme, sent a Circular letter on the 23rd of December, 1937, embodying the said view-points to the factories all over India. They indulged in strong criticisms against the policy of the Syndicate but could not produce a better scheme to regulate the marketing of sugar for the interests of the Industry. With praise-worthy promptitude, Lala Karam Chand Thapar, the Chairman of the Syndicate, sent a counter-circular on the 1st of January 1938 to the Indian factories wherein every argument of the opposition was properly met and he issued a fervent appeal to the members of the opposition to join the Syndicate and to make it a success.

At this critical stage of the Syndicate, the promoters began to realise the necessity of Government control for its proper functioning. This most important question of inviting the Governments of U. P. & Bihar to exercise their control over the operations of the Syndicate was discussed at the Joint-Sugarcane Conference held at Lucknow on September 29th & 30th, 1937, under the Presidency of the Hon'ble Pandit Govinda Ballav Pant, the Premier of U. P. Opinion was

found to be divergent on this issue but the leaders of the Industry, like Mr. Sherwani, was of definite opinion that Government control was absolutely necessary for the successful working of the Syndicate. Those who opposed the State help argued that Government control would seriously interfere with the free working of the Industry. They were afraid of any such legislation for the reason that the Government would enact measures in such a way that the interests of the growers would be more safe-guarded than those of the manufacturers. They, therefore, resented any such enactment.

Those who are conversant with the problems of the Industry in other advanced sugar producing countries of the world know it fully well that Government control has been a necessity for the proper stabilization of the Industry in those countries. We have already stated that the sale of all Java sugar—except that produced in indigenous way—is controlled by the Netherlands Indian Association for the Sale of Sugar, popularly known as the NIVAS. This Association was founded on the 31st of December 1932 and its operations were regulated by the Associated Sugar Ordinance which became effective from 1st of January, 1933. The Governor-General of the Netherlands exercises a very wide control over the working of the NIVAS under the said Ordinance. The Sugar Industry in the United Kingdom is also now widely controlled by the Government by the Sugar Industry (Re-organization) Act, 1936. Under this Act, a Sugar Commission has been set up which has been charged with the responsibility of keeping under review the whole range of sugar production, marketing and of giving advice and expert assistance when required by the Government. It is needless to state that the U. K. Government exercise much control over the constitution and function of this Commission. The Sugar Industry in South Africa is also regulated and controlled by the South African Sugarcane Act of 1936. The new American Sugar Legislation passed by

the U. S. Senate on 19th August 1937 and by the House of Representatives on the following day has given wide powers in the hands of the Government to control the Industry. The Secretary of Agriculture has been authorised by the U. S. A. Sugar Act of 1937 to take a number of measures which are calculated to stabilize the Industry throughout the length and breadth of U. S. A. Enactments, more or less on similar line, have also been framed in other important sugar producing countries. We, therefore, find no reason why some Indian mill-owners should oppose the idea of State control at a time when they cannot combine together to avoid cut-throat and keen internal competition for the sale of sugar.

However, the Joint Sugarcane Conference of 1937 considered the proposal of forming an Inter-Provincial Sugar Control Board with the following objects : —

- (i) To closely supervise the working of the Syndicate already established by the sugar manufacturers.
- (ii) To advise necessary changes in the constitution and working of the afore-said Syndicate.
- (iii) To serve as a permanent standing Committee of the two Provinces to which problems of common interest may be referred.
- (iv) The Industry shall have to provide for meeting the cost of the Board.

The question of securing the Government control was finally decided at the Extra-ordinary General Meeting of the Syndicate held at Lucknow on the 30th December of the same year. There were two issues before this meeting. If it was

possible to form a voluntary marketing organization, comprising within its fold all the factories in India specially of U. P. and Bihar or whether Governmental legislation, enforcing all mills to join such an organization, was the alternative. The general opinion of the meeting was that marketing of sugar on such a big scale was difficult of successful achievement without State help of any kind. The meeting resolved that the Government legislation was essential to make the Syndicate a successful sales organization. A deputation of 6 members were duly authorised to negotiate with the Governments of U. P. & Bihar regarding provisions of the Legislation. The Bihar Sugar Factories Control Act was the outcome of consultation with this deputation. It is to be noted here that the Indian Sugar Mills Association also passed a Resolution favouring the move of the Syndicate to secure the Government control for its proper functioning. It will be observed from what has been stated above that the lack of co-operation amongst the members of the Syndicate and the opposition of some mill-owners, being inspired by their group interests, were the factors which compelled the promoters of the Syndicate to seek for the State assistance. The Syndicate was, therefore, recognised by the Governments of U. P. & Bihar as a Central Sales Organization by the passing of the Sugar Factories Control Act in those two Provinces. Every factory in those two Provinces has now been compelled to enrol itself as a member of the Syndicate and the Governments have assumed powers under the Act to have control, amongst others, over the fixing of sugar prices by the Syndicate from time to time and also a general control over its management by nominating 6 Directors in the Directorate of the Syndicate. After its recognition by the Governments, the Syndicate also amended its Articles of Association in the light of various suggestions received from the members and non-members and also from the said Governments. The amendments were duly ratified by an Extra-ordinary General Meeting of the Syndicate held at Lucknow on the 12th of March, 1938.

We have already pointed out that from the very beginning of the formation of the Syndicate, the sugar merchants were under the impression that they would have now no *locus standi* in the sugar trade. After the passing of the Bihar Sugar Factories Control Act, the Cawnpore Sugar Merchants' Association submitted a representation to the Bihar Government urging the continuance of the sugar merchants as the distributing agents for the Indian sugar trade and the enforcement of an approved sale contract. Referring to Sec. 10 of the Bihar Sugar Factories Control Act dealing with the conditions and form under which licenses would be issued to the factories, the Association strongly urged the inclusion of the following conditions in the license : that mills might sell their sugar through any agency provided such sales were made within the approved price limits of the Syndicate. The Association also urged the following points before the Governments :—

- (i) The Government had justification in assuming powers to control, for eliminating internal competition, by regulation of sugar sale ; but an excessive degree of control might benefit a section of mill-owners and was likely to prove harmful to the Industry as a whole.
- (ii) If the mills were not given an option to sell their produce through any agency they chose, they would be at the mercy of the distributors or the collective distributive organization that might be appointed by the controlling body. Such distributors or distributing organization would be in a position to dictate to the mills how they were to sell their sugar and in certain circumstances,

also the prices at which the sales were to be made. This amounted to a virtual transfer of the administration of sales of sugar from the mills to distributors.

(iii) If the agency for sale of sugar were centralized or monopolised, the selling agency might find it profitable to create a set of circumstances which would defeat the purpose of the Government and make the control over Industry impossible or make it necessary for the Government to arm itself with powers virtually amounting to the nationalization of the Industry which was perhaps not possible under the present Government of India Act.

(iv) At present financial risk involved in distribution was divided among the sugar merchants and manufacturers but if the function of distribution were taken up by the manufacturers themselves or any other agency, the entire risk involved in marketing would fall on the Industry and would be very embarrassing to the smaller mill-owners, for whom selling agents' deposits had been necessary to keep the mills running.

(v) It should be made compulsory for the mills to sell their sugar on contract forms approved by the Government.

But these fears of the merchants were allayed by an important announcement by the Chairman of the Syndicate at its meeting held at Lucknow in March, 1938, to which

we refer below. In the said meeting at Lucknow, the following most important decisions were also arrived at :—

(i) The Syndicate took into its own hands the direct sale of all members' sugar through their existing organizations with effect from 2nd April, 1938. It is needless to state that it is another bold step which the Syndicate has taken.

(ii) The Syndicate does not desire to disturb the present selling privileges of the factories,

With regard to the fears entertained by the merchants, Lala Karamchand Thapar, the Chairman of the Syndicate, observed in the said meeting as follows :—

“Much undue apprehensions are being entertained particularly by the merchants but I would like to reiterate that their fears are groundless. I need hardly emphasise that such a huge task as the distribution of million tons of sugar throughout the length and breadth of a vast country like India cannot be accomplished without the aid of a sufficiently large army of middle men whatever be their organization. The fears, therefore, that are entertained in certain quarters appear to be without foundation.”

(iii) In the light of the situation created by the passing of the Sugar Factory Control Act in U. P. & Bihar and also in view of the conditions of the sugar trade, now prevailing, it is absolutely essential that a standard Con-

tract Form acceptable to the merchants and the manufacturers as well should be drawn up by the Syndicate at the earliest opportunities.

As the Syndicate has now been recognised by the Governments of U. P. and Bihar,—where 85 p.c. of the total production of sugar in India is produced—it has, therefore, become an effective sales organization. Besides the factories in those two Provinces, which have been compelled to join the Syndicate, it is most desirable that Sugar factories in other parts of India should also be its members so that the Syndicate may become a real Central Marketing Organization to the benefit of the entire Indian Sugar Industry. The members of the Syndicate should always be alive to discharge their duties towards the Syndicate by remembering that sincere co-operation amongst the member-factories is needed to make it a success. The members should always conform to the following :—

- (i) To send all returns and informations in due time at the directions of the Syndicate.

For this purpose, every factory should maintain an efficient staff specially for the Syndicate's work. The members of this staff should be fully acquainted with the details of the working of the Syndicate, the contents of all its circulars and the different provisions of the Articles of Association. The expenses incurred by the factory in this respect will be amply counter-balanced by the higher prices obtained for sugar through the efforts of the Syndicate.

- (iii) To strictly adhere to the selling quotas and the rates of sugar as fixed by the Syndicate.

- (iii) Not to make any forward sale without the previous approval of the Syndicate.
- (iv) To comply with other instructions issued by the Syndicate from time to time.

Since the formation of the Syndicate, doubts have been entertained in many quarters that when it will function successfully, the market of sugar will go up and it will encourage the establishment of more sugar factories in other Provinces where the Sugar Factories Control Act does not apply. Cases of Bengal, Bombay and Southern India have been cited for example. It has also been held that this Industry will also develop in more advanced Indian States. This fear is not entirely groundless as more sugar factories are going to be started in Bengal, Gwalior, Travancore, Nepal and North West Frontier Province. The establishment of these factories will bring the question of over-production of sugar to a crisis and the activities of the Syndicate will suffer a serious set-back. The present scheme and the status of the Syndicate will not permit it to control the production of sugar all over India. The remedy which has been suggested is that the production and marketing of sugar should be controlled by the Central Government. The authority for introducing licences for the erection of new factories and the extension of the old ones should be vested with an All India Body. That is, the present Syndicate should be recognised by the Government of India so that its operations might extend to all the Indian Provinces. We, therefore, believe that this complex problem will receive the attention of the Government of India when they will frame their decisions regarding the recommendations of the Second Tariff Board.

It is true that the task of the Syndicate will become easy if the consumption of sugar increases gradually. This brings us to the question of examining the possibilities for its use in other industrial purposes. It has been found that it can be conveniently used as an industrial raw material, in the manufacture of transparent soaps, tanning materials, dyes, explosives, leather, printer's rolls and pharmaceutical preparations. It has also found use in removing lime from hides and in dissolving lime as mono-calcium saccharates from minerals. It can also be used for protecting wood from termites. Its use for replacing formaldehyde in the manufacture of "Bakelite" has also been advocated. Sugar added to rubber in vulcanization process seems to increase the resistance to wear. Tests were carried out in Germany which proved after 36 hours of grinding, that tyres with 1 p. c. sugar added to the rubber lost 900 grams in weight while tyres without sugar lost 1207 grams in weight.

SYMES in describing work on sugar plastics relates the statement of an enthusiastic booster of the Ford process who visualized the following picture : "the woman of the immediate future might look forward to being clothed from head to foot in spun sugar polymerized by the Ford process, wearing shoes made of sugar, leather with heels of sugar plastic, write with a sugar pen from a sugar-mounted bag, which contains an unbreakable sugar mirror ; sit in a sugar plastic chair and watch a picture projected by a sugar lens through a sugar photographic film" (I. S. J. 1937, p. 117)

In India, no work has yet been undertaken to utilise sugar in the industries and preparations as indicated above. The attention of the Industry as well as of the Government should be focussed to this important direction. It has been stated in a previous chapter that the right to export sugar to foreign countries other than Burma has been denied to India by the last International Sugar Conference held in London for a period of 5 years from Sept., 1937. The Syndicate should, therefore,

try to push the Indian sugar in territories like, Afghanistan, Nepal, Tibet, Ceylon, etc. These countries consume quite a large amount of sugar annually and if the authorities of the Syndicate can successfully negotiate with the respective Governments, a fair amount of India's production can be easily consumed in those areas. Although the prohibitive transport charges may stand on the way of the Syndicate in sending sugar to such distant places, sufficient pressure should be brought upon the proper authorities to reduce the transport charges as far as practicable.

In concluding our remarks on the important problem of marketing of Indian sugar, we want to emphasize that a complete survey of India's production and consumption of sugar is absolutely essential for the success of the Syndicate. It is, however, gratifying to note that the Government of India have already taken proper steps to complete this survey which will benefit the Industry to a very great extent. Another need of the Industry is the establishment of a Sugar Control Committee on the lines of the Tea and Coffee Control Boards. It is also pleasing to note that the Government of India have accepted this demand of the Industry and have decided to appoint a Sugar Control Committee which will look after the interests of the manufacturers and the agriculturists. The Government of India have also decided to place a sum of Rupees five lakhs at the disposal of this Committee for its successful functioning. This is a right move in the right direction.

Another danger to which the Indian Sugar Industry has already approached is the question of over-production. Although opinions may differ on this important issue but a careful analysis of the present statistical position has disclosed the fact that India's production of sugar has far exceeded her demand. Unless, therefore, the production is regulated by a legally constituted Body, no efforts of the present Syn-

dicate can save this Industry from another severe depression. It is, therefore, imperative that due consideration should now be given to tackle this problem which must be viewed from an All India aspect. The need for an immediate rationalization of Indian Sugar Industry should no longer be shelved. In giving his opinion about the present problems of the Indian Industry, Dr. Maxwell, an authority on sugar of international repute, thus observes :—

“The pre-eminent problem is that of the control of production in accordance with capacity to sell. It may be expedient, as in other countries under similar conditions, that rationalization should be enforced by legislation. While, however, in sugar countries of longer experience all the factories are on practically the same level of efficiency, this can by no means be said of India. Therefore, the method of rationalization should be of such a nature as to stimulate the Industry to put its house in order by greatly increasing its efficiency. To this end, the output of individual factories might be restricted not merely on their ability to pass cane through their plant but also on their technical efficiency in the recovery of sugar.”

(I. S. J. 1937, p. 341.)

Consumers' Burden.

Closely associated with the problem of marketing is the interest of the consumers. It has been held that a regulated market is expected to bring an upward trend in the prices of sugar to an uneconomic level to the prejudice of the consumers. It is true that if the price of sugar increases to an unprecedented level, the consumption is bound to undergo an appreciable decrease to the great detriment of the Industry. The question,

therefore, requires a very close examination. We propose to analyse this problem from the following view points :—

- (i) What should be the fair selling price of sugar at which the Industry can earn a reasonable profit ?
- (ii) What should be the price at which the consumers may purchase it to their benefit ?
- (iii) The position of the consumers in other foreign countries.

After making a detailed survey of all the problems connected with the cost of production of sugar, its marketing and the interests of the consumers, the first Tariff Board came to the conclusion that Rs. 8-13-1 per maund should be the fair selling price of Indian sugar during the whole period of protection. In arriving at this figure, it was taken for granted by the Board that molasses would be sold at - /8/- a maund during this protective period. It should also be noted here that the talk of imposing any excise was out of consideration during that time. Unfortunately for the Industry, there has been a complete disappearance of the market for molasses the disposal of which from being an asset has become a debit. An excise duty of Rs. 2/- per cwt. has been imposed upon the Industry against the teeth of all opposition. However, making allowance for the fact that there is now no price for molasses and so it should be recouped from the price of sugar, the price of the latter should have gone upto Rs. 9/5/- a md. But the position is entirely otherwise. The average price of Indian sugar, even with the backing of the Syndicate, is now barely Rs. 7/8/- a md. ex-mill. That is, minus the Excise Duty, the net price obtained is Rs. 6/- a maund. When compared with the calculations of the first Tariff Board and adding the price of molasses to the said fair selling price, the Industry is now losing Rs. 3/5/- per md. of

sugar manufactured. On the production of the crop year 1936-37 and even calculating that the Indian manufacturers obtained this price of Rs. 6/- a md. during that season, the net loss to the Industry comes to about Rupees 10 crores for that crop year only. The consumers as well as the Govt. have, therefore, been benefited to the extent of this ten crores of rupees in that year due to the development of this Industry. This is one side of the picture when we take into consideration the calculations of the first Tariff Board.

Let us now turn our attention to the prices of Java sugar now prevailing in the Indian sugar market. The recent quotation in Calcutta is Rs. 10/8- a md. inclusive of the protective duty. The rate of Indian sugar in Calcutta is about Rs. 8/- to Rs. 8/2/- per md., out of which, Rs. 1-8-0 is to be deducted as Excise Duty. The net price obtained by the manufacturers is, therefore, Rs. 6-8-0 to Rs. 6-10-0 a maund. The difference between the two prices is about Rs. 4/- a md. It will now be seen that the Industry has lost a sum of over Rs. 11 crores for that season. But this loss, on the part of the Industry, has benefited the consumers to an extent which they could never expect within such a short period of protection.

It is extremely difficult to fix exactly the fair selling price of Indian sugar as the costs of production are found to vary widely according to the local conditions obtaining in any particular Province. The task is by no means an easy one. However, taking the price of cane at -/6/ a md. delivered upto the cane carrier and on the basis of nine per cent recovery, it has been calculated that the average cost of production per md of sugar in an Indian factory of medium size is about Rs. 6/8/- a md. inclusive of all manufacturing expenses, depreciation and interest. To this figure, the excise duty of Rs. 1/8/- a md is to be added thus increasing the cost of production to Rs. 8 a md. ex-mill. Allowing a bare minimum profit of -/8/- a md. to the manufacturers, the fair selling price of Indian sugar should then be fixed at

Rs. 8/8/- a md. Even on the basis of this modest calculation, the Indian factories are now losing Rs. 1/8- per md. when compared with the present selling prices. We, therefore, see no reason why this low price of sugar is to be considered as a burden by the consumers.

Let us now examine carefully the prices which the consumers have paid for their sugar during the pre-protective period. The following table will be illustrative :—

<i>Year</i>	<i>Prices per md.</i>		
	Rs.	as.	p. (Calcutta price)
1920-21	29	14	0
1921-22	16	8	4
1922-23	15	9	9
1923-24	18	0	0
1924-25	14	1	8
1925-26	10	13	9
1926-27	11	13	11
1927-28	10	6	0
1928-29	9	12	6
1929-30	9	0	5
1930-31	8	15	5

It will be observed from the above figures that the average price which the consumers had to pay before the protection was over Rs. 14/- a md. We have seen that the present selling price of Indian sugar is a bit over Rs. 8/- a md. The benefit conferred to the consumers by the protection can now be better imagined. ! Apart from the reduction in the price of sugar brought about by this protective measure, India has become wholly independent of her sugar supply thus saving a huge drainage of crores of rupees which she had to spend for the import of foreign sugar. The following figures of import, before the protection was granted, will speak for themselves :—

<i>Year</i>	<i>Import in Tons.</i>	<i>Value in Rs. (Lakhs)</i>
1926-27	826,900	18.36
1927-28	725,800	14.50
1928-29	868,800	15.86
1929-30	939,600	15.57
1930-31	901,200	10.54

This huge wastage of about 15 crores of rupees per annum for the import of an important article of diet of daily consumption has been totally stopped by the growth of this Industry. Mr. M. P. Gandhi in his 1937 Annual has beautifully summarized the blessings of protection in the following manner :—

- (i) It has brought an improvement in the conditions of millions of cultivators as a result of realization of a better prices from the cultivation of cane crop.
- (ii) In the severe problem of unemployment particularly amongst the educated and technical men, it has given immense relief and has made provisions for 2500 Science Graduates, 10,000 other educated staff and about 1,00,000 lakh of skilled and unskilled workers.
- (iii) It has afforded a very good opportunity for the capitalists to invest their money in this Industry. It has been estimated that upto this date about 33 crores of rupees have been invested for its development.
- (iv) It has been able to create a confidence about India's abilities in developing her own Industrial enterprises.

It will be further interesting to note the following approximate distribution of about 14 to 15 crores of rupees per season saved out of the stoppage of the annual import of foreign sugar.

Cultivators	Rs. 9 crores.
Wages to staff & labourers	Rs. 1 crore.
Railways & Steamship Cos.	Rs. 2 crores.
(For the freight of sugar cane and sugar)	
Mill stores purchase	Rs. 1 crore.

Rs. 13 crores.

It will be admitted that the consumers have been directly or indirectly benefited from the proceeds of this Industry.

It has been estimated that the average cost of production of sugar in India is Rs. 8/8/- a md. ex-factory inclusive of excise duty. To this rate is to be added the freight charges which can be taken, on an average, at -/8/- to -/10/- a md. upto Calcutta. Therefore, the selling price of Indian sugar comes to Rs. 9/- to Rs. 9-2-0 per md. in the Calcutta market. Making allowance for brokerage and other charges, consumers are expected to get their sugar in Calcutta at a retail price of Rs. 9-8-0 a md. Considering the prices which they had to pay during the pre-protective period and taking into consideration the immense benefit which they have now enjoying directly or indirectly due to the expansion of this Industry, we consider the said rate of Rs. 9-8-0 a md. as extremely fair and reasonable. The consumers' interest will certainly be jeopardised if the Syndicate regulates the market in such a way that the retail price of sugar goes over the said limit. But judging from the present position of the Industry when the production has exceeded the consumption, we consider this contingency as out of practical realisation.

The sacrifices which the consumers of other countries have made for the development of this Industry in their re-

spective lands will furnish an example to the Indian consumers who cry for continuous reduction in the prices of their own sugar. They will derive a lesson from the following rates of sugar which are most recent but slight approximate in their values :—

<i>Countries.</i>	<i>Retail price of sugar per md.</i>		
	Rs.	as	p.
U. S. S. R.	82	8	0
(Soviet Russia)			
Italy	35	3	0
Germany	33	2	0
Netherlands	28	2	0
Czechoslovakia	23	12	0
Turkey	21	14	0
Poland	20	10	0
Portugal	20	6	0
Australia	19	6	0
Newzealand	17	8	0
Union of South Africa	17	8	0
France	16	14	0
Irish Free State	16	14	0
U. S. A.	12	1	0
Great Britain	11	4	0
Belgium	10	10	0
Japan	10	10	0

Can anybody deny that in comparison with the said level of prices, Indian sugar is not selling at too cheap a rate? We desire that the supporters of the theory of "consumers' burden" should very carefully go through these figures before they advocate for any further reduction in the prices of Indian sugar.

In conclusion, we want to assure the public that the Syndicate will never harm their interests by pulling up the rate of sugar to an unprecedented high level. This pledge has been repeatedly given by Lala Karamchand Thapar in almost all

of his presidential addresses delivered before the Syndicate. In his address delivered at Lucknow on the 20th November 1937, he observed as follows :—

“I once again wish to make it clear that whether Government support comes or not, the manufacturers will not fail to look to the fact that the interests of the consumers and the growers did not suffer if for no other reason than for that of “enlightened self-interest” and of our belief that our salvation lies there.”

The deputation of the Syndicate which waited on the Governments of U. P. and Bihar also assured the Governments that the interests of the consumers were safe in their hands. The deputation emphasised the fact that sugar should not be sold at rates which were not economic to the consumers. Sardar Kripal Sing in the course of his presidential speech, delivered at the 5th Annual General Meeting of the Indian Sugar Mills Association held at Lucknow on the 28th August, 1937, clarified the position of the Indian consumers, in his own beautiful characteristic way, as follows :—

“I am not, however, unaware of the criticisms sometimes levelled against this policy of protection in the name of the consumer and in the interests of Government revenues. Let me say it plainly that I have never been able to understand the theory about “the consumers’ burden.” Surely, even though considering the relation to an individual, it may be cheaper to import foreign commodities or articles than to develop the manufacture of indigenous ones, it must not

be forgotten that it is always in the interests of the nation to encourage the development of industries within the country and stop the annual drain of wealth to foreign countries. I do not wish to suggest for a moment that industries should be developed in the country irrespective of the existence of any adverse economic factors or without any heed as to their cost to the country, but you will agree with me, gentlemen, that if there is a fair chance for the growth of a particular industry, it is in the country's interest to help its development even though it may be at the cost of higher prices for the consumers for sometime. But I must make it plain that in the case of the Sugar Industry, the general public has not been called upon to make even this much sacrifice. While the consumer had to pay more than Rs. 10/- per md. during the pre-protection period for his sugar, the prices have continuously been brought down with the result that to-day sugar is being sold in India at an unprecedentedly low rate of about Rs. 6/- per md. Never before in living memory did the public get sugar so cheap as they are getting it now. Perhaps it will interest you, gentlemen, and be some disillusionment to such of our friends who put forward the plea of the consumers' burden to know that the retail prices of sugar in India are among the lowest in the world barring three countries."

CHAPTER VII.

The Bihar Sugar Factories Control Act, 1937.

A Critical Review.

Due to the rapid expansion of the Sugar Industry in India, there was a severe cut-throat internal competition amongst the producers in the matter of sale of sugar. As a result, the price of sugar fell very sharply to a most unprecedented low level. The entire Industry was thrown into utter confusion in 1936-37 season and the mill-owners became extremely nervous as to its future. At such a critical stage, the Government of India dealt another blow upon it by enhancing the Excise Duty from Rs. 1/8/- to Rs. 2/- per cwt. Sugar was selling at this time at Rs. 5/8/- to 5/12/- a md. ex-mill rate and in view of the enhancement of the Excise Duty, the mill-owners decided to stop crushing at an early date during the season of 1936-37. This threatened action on the part of the Industry was going to ruin the growers but the timely intervention of the Congress Working Committee and and the Governments of U. P. & Bihar came to their rescue. The mill-owners agreed, though with much reluctance, to continue the crushing just to consume the standing cane crop to the relief of the growers. But it was felt by every body connected with the sugar trade that a permanent solution was absolutely essential to place this Industry on sound footing.

The Industry was not also silent during this critical period. It set up a Syndicate at its own initiative to regulate the price of sugar from July, 1937. It was believed that if this Syndicate become a success, the Industry would be stabilised. But it was soon found that due to the lack of co-operation amongst the various units of the Industry and even amongst the members of the Syndicate, it could not function successfully as a voluntary organisation. It became evidently clear beyond all doubts that the control of the State was an absolute necessity to make the Syndicate an effective marketing organisation.

Besides the abnormal fall in the price of sugar for the reasons as stated above, the Industry was also faced with the following unsatisfactory features :—

- (i) The cane-growers received very little encouragement from the factories to adopt more efficient methods of cultivation.
- (ii) The supply of cane was made mainly through middle men—a practice which had given rise to many abuses resulting in the exploitation of the growers.
- (iii) There had been over-production of cane which had resulted in the lowering of cane prices below the economic level.
- (iv) The growers had been left in uncertainty as to the cane requirements of the factories as a result of which a feeling of uncertainty with regard to the disposal of cane was always found amongst them.

- (v) The growers had been compelled to pay illegal gratification to the cane staff or the purchasing agents before they could obtain the "purjis" for the supply of cane.

It would be apparent that legislative action was called for if the above defects were to be remedied for the healthy growth of the Industry. With such a gloomy picture in their front, the Governments of U. P. & Bihar, in their wisdom, convened a Joint Sugar Conference at Patna during October of 1937 to discuss and formulate definite proposals in order to rehabilitate the Industry. This Conference finally decided in favour of State assistance and appointed a Sub-Committee to give final shape as to the different provisions of the legislation. This Sub-Committee met at Patna on 21st. and 22nd. October, 1937, and drafted their recommendations regarding this enactment. The Bihar Sugar Factories Control Act is a result of the deliberations of the said Conference and Sub-Committee. The said Joint Sugar Conference was held under the able Chairmanship of the Hon'ble Pandit Govinda Ballav Pant, the Premier of U. P. Besides his masterly guidance, most valuable assistance was also rendered to the deliberations of the said Conference by the Hon'ble Dr. Syed Mahmud and the Hon'ble Dr. K. N. Katju, Ministers for Education and Development for Bihar and U. P. respectively. The Conference was also fortunate enough to be guided by the wise counsels of Dr. Rajendra Prasad, the Bihar Leader, Mr. D. R. Sethi, formerly Director of Agriculture, Bihar, Mr. Livingstone, Senior Marketing Officer to the Government of India and Mr. R. C. Srivastava, Director of Imperial Institute of Sugar Technology, Cawnpur. It should be noted here that similar legislation was also enacted in U. P. as a result of the decisions of the said Joint Sugar Conference.

A Short Synopsis of the Act.

The Act is a very short one consisting of only 31 Sections in all. It has been divided into six chapters and each chapter deals with a particular subject. Chapter I deals with the definitions and short title and other preliminaries of the Act. The constitution, function, powers and duties of the Sugar Control Board and Advisory Committees, the appointment of the Cane Commissioner and the Cane Inspectors have been discussed in Chapter II.

Chapter III is composed of five sections only and has been devoted to the various provisions of the licensing of factories, different forms of license, conditions for granting such licenses and the appointment of a Manager by a factory who shall be held responsible to the Government for the purposes of the Act. The system and the rules through which the factories will purchase the cane have been described in chapter IV. This is a very important chapter as it deals with the question of supply of raw materials. Matters relating to the reservation of an area for a particular factory, survey of reserved area, estimate of quantity of cane required by a factory, purchase of cane in reserved and outside areas, declaration of assigned areas and purchase of cane therein and the maintenance of a Register containing the names of all cane-growers and Cane-growers Co-Operative Societies in a reserved area have been elaborately discussed in this chapter. Chapter V deals with the question of fixing the minimum price of cane and an additional price, besides the minimum price, to be paid to the cultivators for special varieties of cane. The following miscellaneous subjects have been described in Chapter VI.

- (1) System of licensing of Purchasing Agents for the supply of cane to the factories from non-reserved and non-assigned areas.

Such a license for purchasing shall not be granted to any person who does not pay the prescribed deposit and the Collector has been vested with the powers to forfeit this deposit due to misconduct of the person to whom such a license is to be granted. This system will enable the Provincial Government to control the Purchasing Agents to the great relief of the growers.

- (2) The distribution of cane seedlings by the factories.

The Governor, after consulting the Sugar Control Board, may prohibit any factory from distributing bad variety of seed cane.

This will stimulate the distribution of good varieties of seedlings and so it is expected to raise the standard of cultivation and the quality of cane.

- (3) Penalty for breach of conditions of license and other penalties.

Sections 26 and 27 deal with the different penalties that will be imposed on the factories in case of breach of conditions of taking out different licenses under this Act. These sections also provide for the penalties for not keeping the prescribed Cane Register, for purchasing canes outside reserved area in contravention of the provisions of this Act, for distributing bad seed canes etc. etc.

- (4) The imposition of a cess on the sale of cane for the use of factories.

In order to enable the Government to carry out the necessary measures in connection with the improvement of cane cultivation and its planned production which will involve considerable expenditure, it has been provided to impose a tax upto a maximum limit of 6 six pies a md. on the sale of sugar cane to a factory or a cess at the same rate on the entry of cane into a local area notified in this behalf for consumption or sale therein.

It is to be noted here that the Government have been pleased enough to exempt the factories from paying this cess or tax for the 1937-38 season only.

- (5) The Provincial Government have been empowered to make rules to carry out the different provisions of this Act.
- (6) The Sugar Cane Act of 1934 has been repealed and this Act will remain in force until June 30th. 1941, by which time, it is expected that adequate experience will be gained of its working.

Main Provisions of The Act.

From what has been stated above, it will be manifest that the Act has made different provisions for the Government control from the preparation and planting of seed to the distribution of sugar, from the grower to the consumer. Let us now, therefore, discuss in some details, the main principles of the Act so that we can have an idea as to the extent to

which the Government can exercise their control from the field to the market of this Industry. The main provisions of the Act are as follows :—

The licensing of sugar factories :-

It is now an admitted fact that one of the reasons for which the price of sugar has undergone such a fall is over-production. There is no doubt about the fact that India's production of sugar has far exceeded her consumption. The position has been made worst by the decision of the last International Sugar Conference held in London by which India has been prohibited to export sugar to foreign countries other than Burma for a period of five years from September, 1937. It will be further admitted that the price of sugar cannot be stable until the equilibrium between production and consumption has been established. Moreover, the price of sugar-cane is interwoven with the price of sugar. With the fall in the price of sugar, the mill-owners are bound to reduce the price of cane. This has been the bitter experience of 1936-37 season. We must also remember that the low price of cane will lead in the reduction in area with the result that in the following season, there will be a shortage of cane due to contraction of cultivation.

It now follows that the control of production of sugar must be a very important feature in an attempt to stabilise this Industry. It is with this object in view that provisions have been made in the Act for the licensing of factories. Provision has been made for two forms of licenses. The first one will be for the construction of new factories and extension of the plant of existing factories. This kind of license is absolutely essential because it is not possible to

control the production of sugar unless control can be exercised over the future expansion of the Industry. Section 9, Sub Sec. (1) has prescribed the manner in which an application for a license for the construction of a new factory or any extension of the existing plant is to be made to the Local Government.

In January 1938, in exercise of the powers conferred by Sec. 30, (2), (c) and (e) of the Act, the Bihar Government have made the following Rules regarding the grant of license for the construction of a new factory or an extension of any existing plant.

1. An application for a license to commence the construction of any building intended to be used as a factory shall be filed before the Cane Commissioner who will forward it with his report to the Provincial Government. The Provincial Government shall consult the Board before disposing of the application.
2. No license shall be granted for the construction of any building intended to be used as a factory :—
 - (a) Unless the site of the proposed factory is at a distance of not less than ten miles from any existing factory.
 - (b) Unless the quantity of cane already available within a radius of 10 miles of the proposed site is not less than 60 per cent. of the estimated cane requirement of the proposed factory. The estimated cane requirement shall be calculated at 100 times the daily scheduled crushing capacity of the factory.

- (c) Unless the factory undertakes to build storage accomodation for at least a third of its estimated annual production of sugar. The annual production of sugar shall be calculated at 9 per cent of its estimated cane requirement as determined under (b) above.
3. A license granted for the construction of any building intended to be used as a factory shall be valid for one year and may be renewed by the Provincial Government from time to time untill the construction of the factory is completed.

It will be observed that in granting such a license, the following precautions shall always be taken by the Local Government :—

- (a) That there is a sufficient cane in the area where the new factory will be located.
- (b) That there is no chance for any cut-throat competition amongst the neighbouring factories to secure the supply of cane.
- (c) That the new factory makes sufficient storage accomodation for its sugar so that no difficulty is experienced by it to dispose its sugar throughout all the year round according to the directions of the Syndicate.

The following rules have been made for the license for extension of the plant of an existing factory.

1. The owner, occupier or manager of a factory shall submit an application in proper Form to the Cane Commissioner for a license to increase its crushing capacity and the Cane Commissioner shall submit the application with his report within one month of receipt of the same to the Provincial Government.
2. No such application shall be granted unless the Provincial Government are satisfied after consulting the Board that the extension will materially increase the efficiency of the factory and that additional cane required by the factory is available within a radius of 10 miles from the factory.
3. The license shall be valid for one year and may be renewed by the Provincial Government from time to time until the extension is completed.

Provision has also been made to consult the Sugar Control Board before disposing of the applications praying for the grant of above licenses. It will be clear that in such important matters, the Local Government shall always consult the Industry.

The second Form of license will be for crushing cane. No factory will be allowed to commence crushing until it has taken out a license and such license will prescribe certain conditions which must be observed by the factory. The following Rules have been prescribed by the Local Government governing the conditions of this license.

1. An application in proper Form shall be submitted to the Provincial Government through the Cane Commissioner before the 1st. of February, 1938, and on or before the 1st. of September in any subsequent crushing season.
2. The license granted under sec. 10 clause (3) of the Act shall be subject to the following conditions :—
 - (a) That the factory shall be a member of the Indian Sugar Syndicate Ltd., registered under the Indian Companies Act, which has been recognised by the Provincial Government under Section II (a) of the Act.
 - (b) That the minimum quantity of cane which the factory will crush during the crushing season for which the license is granted shall be 100 times its daily scheduled crushing capacity.

Provided that the condition (b) may be relaxed by the Provincial Government if they are satisfied that the inability to crush the specified quantity of cane was due to circumstances beyond the control of the occupier of the factory.

All applications for renewal under section 10(4) of the Act shall be filed in proper Form before the Cane Commissioner who shall renew such license unless the occupier of a factory has committed a breach of the conditions of the license for which

a penalty has been imposed in which case he shall refer the matter to the Provincial Government for orders.

It will be seen that the most important condition of this license is that the factory must be a member of the Indian Sugar Syndicate Ltd., so that the sale of sugar may be effected according to the instructions of the Syndicate to the best interest of the producers. Sufficient relief has also been given to the growers by imposing the condition stating the minimum quantity of cane that must be purchased by the factory during the crushing season.

In exercise of the power conferred by section 12 of the Act, the following license fees have been levied for a license to be granted under section 9 or section 10 of the Act.

- | | |
|--|---------|
| (a) If the daily crushing capacity of the factory is 1000 tons or over | Rs. 100 |
| (b) If the daily crushing capacity of the factory is 500 tons | Rs. 50 |
| For every addition of 100 tons from 500 to 1000 tons | Rs. 10 |
| (c) If less than 500 tons | Rs. 25 |

2. The fee for a license to crush cane and for annual renewal will be as follows :—

Daily crushing capacity 1000 tons and over	Rs. 50
Daily crushing capacity 500 tons	Rs. 25
For every additional 100 tons from 500 to 1000	Rs. 5
For less than 500 tons	Rs. 15

Regulation of the supply of the sugar cane to the factories.

Zoning System.

This is a most important aspect of the Industry and its importance will be evident from the fact that as many as seven Sections have been provided in the Act regarding the purchase of cane. But, before we actually discuss the details of these provisions, it will be better on our part if we can have an understanding of the system through which the supply of cane was made to the factories before this Act was passed. In this connection, we take the liberty of quoting a portion of the speech delivered by the Hon'ble Dr. Syed Mahmud, Minister of Education and Development, Bihar, in moving that the Bihar Sugar Factories Control Bill, 1937, be referred to a Select Committee :—

“At present sugar factories buy cane which is either offered for sale without any previous arrangement or brought for sale under an agreement. The former is known as *khuski* cane and the latter as *bonded* cane. In case of *khuski* cane the growers are in considerable uncertainty as to whether their cane will be taken and this is responsible for abuses on the part of the factory staff. In the case of *bonded* cane, the supply is regulated by means of *purjis* but in most cases, the agreements are one-sided (i.e. they bind the grower and not the factory) and the distribution of *purjis* for *bonded* cane has given scope for corruption on the part of the subordinate staff of the factory. Even now cane is being purchased from unnecessary long distances which involve heavy transport cost and loss on account of dryage. In order to have an assured supply of cane, factories are encouraging an indiscriminate extension of cane cultivation without any assurance that the

cane will be purchased. In a year of under-production, factories compete with each other and the grower is assured fair treatment. But when there is over-production, the grower is completely at the mercy of the factory because with the low price of 'gur' there is really no other alternative use for his cane. Comparatively few factories have well defined areas from which they draw their supplies with the result that they poach on areas which other factories may be trying to develop. This unhealthy competition may be to the temporary benefit of the grower, but he suffers in the long run. He has not the means for undertaking the improvement of his cultivation and factories are restricting the amount of their advances to growers because of the uncertainty in regard to the supply of cane. In brief, there is chaos in cane supply which promotes inefficiency and encourages corruption. Such a system does call for immediate overhaul. How do we propose to do this ?"

The Hon'ble Minister then observed that the ideal system was that of zoning which would give to each factory a well defined zone from which alone it could obtain its cane supply. The introduction of this zoning system is not a new idea. It was considered by the Tariff Board in 1931, but was not looked upon with favour. It was thought that the competition between factories was the only definite safeguard which the grower possessed for the maintenance of cane rates and it would be inequitable to deprive him by law of this guarantee unless effective statutory provisions could be made for the rates which should be paid for cane.

Conditions, however, have changed since the First Tariff Board's Report. There has been a rapid extension of cane cultivation which resulted in a heavy surplus of sugar cane. If this surplus continues, there will be no competition among the factories to raise cane rates. The growers will be left at the mercy of the manufacturers. It is therefore evident that the system of zoning is the only means by which the interests

of the producers as well as those of the cultivators can be effectively safeguarded.

For a fair and efficient system of zoning to regulate the supply of cane to the factories, the following principles were enunciated by the Hon'ble Minister.

- (a) the principle of regulated production, i.e. the avoidance of over-production of cane intended for use in sugar factories.
- (b) the principle of propinquity, i. e., concentration as far as practicable of supply from areas near the factory.
- (c) the principle of certainty of purchase which will relieve as far as possible the cane-grower from the anxiety regarding the disposal of his cane.
- (d) the principle of direct purchase, i.e. the exclusion as far as practicable of middlemen and their control under a system of licensing where they are found to be necessary and
- (e) the principle of co-operative organisation among cane-growers.

The above principles have been given practical effect by making the following provisions in the Act for the purchase of cane :—

- (a) Every factory, before the commencement of the season, must submit an estimate of the quantity of cane required by it to the Cane Commissioner for his approval.

- (b) The Cane Commissioner, after consulting the Local Advisory Committee, will approve such estimate with such modifications as he may think fit and then issue an order reserving an area to be a reserved area for the purposes of the supply of cane to a particular factory during each working season.
- (c) Each factory shall then have to purchase his cane in the following manner :—
 - (i) From an area reserved for a factory.
 - (ii) From an area assigned to a factory.
 - (iii) From an area neither reserved nor assigned.

If zoning is to be introduced by legislation, two safeguards are necessary for the grower, namely :—exclusion from the zone of all middle men and a definite assurance that in the zone the cane of each grower or cane-growers co-operative society upto a prescribed limit to be determined by the cultivable area will be taken by the factory and that any surplus cane in the zone will get a preference over cane grown in other area if the factory requires an additional supply. If these safeguards are provided and with a minimum price fixed by the Government, the objections to zoning will disappear to a great extent and a general improvement in cane cultivation with increased efficiency in cane supply will then be possible.

The said safeguards have been provided by Section 18 of the Act—the different provisions of which have made it obligatory on the part of a factory to purchase its cane of a prescribed quantity and in a prescribed price in a reserved area either from the cane-growers or cane-growers Co-operative Societies. No factory shall be allowed to purchase its cane within its reserved area from any middleman. It has further been provided that when the supply of cane in reserved area

becomes an excess to that required by a factory, it will have to make agreement either with the growers or with the Co-operative Societies to consume the cane before it decides to secure cane from an outside area.

As soon as a zone is allotted, the factory shall be required to maintain a Cane Register of all individual cane-growers who are not members of Co-operative Societies and of all Cane-growers' Co-operative Societies within the zone. If any factory refuses to register a cane-grower or Cane-growers' Society, the latter may make an application to the Collector and he may, after making enquiry and hearing the parties which he think fit, order the factory to register the name of the cane-grower or the Cane-growers' Co-operative Society or correct any incorrect entry in the Register. Such a Register will contain the following particulars :—

- (a) the name and father's name of the person growing sugar-cane and the name of every Cane-growers' Co-operative Society, the village and thana in which such person resides or in which the head of such Co-operative Society is situated ;
- (b) the areas of the lands capable of producing sugar-cane which are in the occupation of each such person or of the members of each such society ;
- (c) The amount of any advance given to any such person or Co-operative Society and the interest payable on such advance ;

- (d) the total amount of seed cane supplied to any such person or Co-operative Society showing separately early, mid-season and late varieties of cane ;
- (e) the minimum amount of sugar-cane which the factory will purchase from each such person or Co-operative Society. Such minimum amount shall be calculated at a rate of not less than 250 maunds per acre of one-third of the area shown under (b) above or at such rate as the Government may, by notification, direct in any particular year.

It will be observed that the responsibilities of a factory within the reserved area are great and the growers have been fully assured of the disposal of their cane to the factory. They will no longer live with a feeling of uncertainty regarding their crop. The middle-men have been completely excluded from the reserved area. Where no area can be conveniently reserved for a factory, or where the area reserved is inadequate having regard to the cane requirements to the factory, it has been provided to assign areas to the factory in which it will be required to enter into agreements for the purchase of a specified quantity of sugar cane. Such agreements may be with Cane-growers' Co-operative Societies or licensed purchasing agents. But if an agreement is entered into with a licensed purchasing agent, he must again enter into agreements with growers or Co-operative Societies in the assigned area for the full amount which he has undertaken to supply to the factory. In an area which is neither reserved nor assigned, the factory may also purchase cane through a licensed purchasing agent or its employees specially authorised for the purpose. The

difference between a 'reserved area' and an 'assigned area' is that in the former a factory is bound to enter into agreements with cane-growers or Cane-growers' Co-operative Societies while there is no such obligation in the latter. Secondly, in an assigned area, cane may be purchased through a licensed purchasing agent whereas in a reserved area it can only be purchased direct from the growers or Societies. Thirdly, in reserved areas, only factories, for which the areas have been reserved, may purchase cane whereas in all assigned areas, any factory or its licensed agent may purchase cane. It will thus be seen that the Act aims at the organisation of Co-operative Societies amongst the growers. It also aims at the concentration of cane supply, as far as possible, within reserved areas or assigned areas and the gradual conversion of assigned areas into reserved areas. The Cane Commissioner shall always study the circumstances of each factory and decide whether it should have a reserved area or assigned area or both. The cumulative effect of the said arrangements will be that each factory will have a prescribed proportion of "bonded supply" i.e. a supply of cane under proper arrangements. This "bonded supply" may be obtained either wholly from the reserved area, if this is possible, or from assigned areas or partly from reserved areas and partly from assigned areas.

Put briefly, the following are the main arrangements through which the supply of cane will be effected to a factory under the provisions of this Act :—

- (i) Before the commencement of each crushing season, a factory has to submit to the Cane Commissioner in a prescribed form and in prescribed manner an estimate of its cane requirements for the season.

[Sec. 14 (1)]

Under the rules made by the Government, this estimate is to be submitted on or before the 1st. of September of every year. Although it is difficult to prepare such an estimate accurately due to various factors which affect the period of a crushing season, but such an average estimate can be worked out on the basis of the crushing capacity of the plant and the amount of cane that has been crushed during three or four preceeding seasons.

- (ii) On the receipt of such an estimate and in consultation with the Local Advisory Committee, the Cane Commissioner will approve of the estimate with such modifications, as he think fit, but a provision has also been made to appeal to the Local Government against his decision.

[Sec. 14 (2), (3)]

- (iii) After the said estimate has been approved of and in consultation with the Local Advisory Committee, the Cane Commissioner will declare any area to be a reserved area for the purposes of the supply of cane to a particular factory during the crushing season.

[Sec. 15 (1)]

- (iv) The factory shall have to maintain a Cane Register in the prescribed form and in prescribed manner regarding the individual cane-grower or the Societies. Copies of such register shall be supplied to any grower or a Society on the payment of prescribed fees.

[Sec. 17 (1), (2) and (3)]

- (v) A cane-grower or a Society has been given the definite right, within the reserved area, to sell his cane at a prescribed limit and rate and on the prescribed terms and conditions to a factory. Within a reserved area, the factory shall have to purchase its prescribed quantity of cane either through growers or Societies. No purchasing agent can purchase cane from a reserved area without the previous approval of the Local Government.

[Sec. 18 (1), (2), (3), (4)]

- (vi) Where necessary and in consultation with the Local Advisory Committee and the factory concerned, the Cane Commissioner may declare any area to be an assigned area for the purposes of supply of cane for that particular factory. In this area, a factory shall have to purchase its prescribed quantity of cane either through a grower or a Society or a licensed purchasing agent but the latter shall have to enter into agreements with the cane growers or Cane-growers' Co-operative Societies in respect of all cane which he has undertaken to supply to the factory.

[Sec. 19 (1), (2), (3), (4)]

- (vii) If the growers or the Societies in an assigned area are not willing to supply the required quantity of cane to a factory or fail to supply the required quantity, the factory, after giving proper notice to the Collector, may purchase its cane from outside the assigned area.

[Sec. 19, (5)]

- (viii) In an area which is neither reserved nor assigned, no person can purchase cane except :—
- (a) the occupier of a factory or a person employed by him for the purpose of making such purchase.
 - (b) a purchasing agent or a person employed by him for the purpose of making such purchases.
 - (c) a Cane-growers' Co-operative Society.

[Sec. 20]

Minimum Price.

Section 21 of the Act has provided for a minimum price for sugar-cane intended for use in a sugar factory which will be fixed by the Provincial Government in accordance with the rules framed under the Act. Every agreement for the supply of cane to a factory shall provide for the payment to the seller of a price not less than the minimum price. The provisions regarding the minimum price are elastic, but the intention is that the Provincial Government will prescribe an absolute minimum rate and a progressive scale which will secure an increased price for cane with the increase in the price of sugar. In order to induce the growers to raise the standard of cultivation of cane and to grow the early and late varieties, the Provincial Government have been vested with the powers to direct that in addition to the minimum price, a premium shall be paid for special varieties of cane required by the factory.

Fears have been entertained in certain quarters that such latitude of powers in the hands of the local Government and in their zeal to always protect the interests of the growers, the minimum price of cane may be fixed in such a way that the interests of the manufacturers will suffer. In this connection,

we will quote the speech of the Hon'ble Minister of Education and Development which he delivered before the Assembly in moving the consideration of the Bill leading to the passing of this Act ;—

“A policy of indiscriminate price raising will be suicidal and would kill the proverbial goose which lays the golden eggs for our cultivators. I wish, therefore, to make it clear that while we are determined to do all we can to secure a fair return to the cultivators, there is a limit beyond which we cannot go. Besides, our ideal must be the gradual reduction of the cost of cultivation of cane which means the progressive lowering of the minimum price. Only by this means we can hope to compete with other sugar producing countries on equal terms.”

Sugar Control Board And Advisory Committees.

Sections 3 and 4 of the Act have provided for the establishment of Advisory Committees and a Sugar Control Board respectively. The provisions have been made to secure a close co-ordination and co-operation of the Industry in the matter of administering some of the most important provisions of the Act.

The Sugar Control Board will deal with the major problems of the Industry such as the licensing of the factories, the determination of the conditions of the license and the fixation of the minimum price of cane while the Advisory Committees will be consulted on the local problems such as, the preparation of the cane estimates of the factories, the declaration of reserved areas and assigned areas, the licensing of purchasing agents etc. etc.

In exercise of the powers conferred by clause (a) subsection 30 of the Act, the Governor of Bihar has been pleased

enough to make the following rules with regard to the constitution, powers, duties etc. of the Sugar Control Board :—

- (i) The Board shall consist of fifteen members.
- (ii) The Minister in-charge of Education and Development Department of the Government of Bihar and the Secretary to the Government of Bihar in the said Department shall be ex-officio members of the Board.
- (iii) The remaining members shall be nominated by the Provincial Government and shall include an equal number of representatives of the sugar factories and of cane growers.
- (iv) The Board shall, in addition to the powers and duties conferred upon it by the Act, advise the Provincial Government in all matters connected with the Sugar Industry of the Province that may be referred to it by the Provincial Government.
- (v) The Governor shall by notification appoint the Chairman and the Secretary of the Board. The Minister of Education and Development, Bihar, has been appointed to be the ex-officio Chairman of the Board and the Secretary of the said Department as the Secretary of the Board.

Draft rules have also been made as to the procedure which is to be followed in convening and conducting the meetings of the Board.

Tax On Sugar Cane.

In order to enable the Government to carry out the necessary measures in connection with the improvement of the cane

cultivation and its planned production, which will involve considerable expenditure, it has been provided to impose a tax upto a maximum limit of six pies a md. on the sale of sugar-cane to a factory or a cess at the same rate on the entry of cane into a local area, notified in this behalf for consumption, use or sale therein. It has been stated above that this tax has not been levied on the factories for the season just ended i.e. 1937-38. This tax will certainly raise the price of cane to some extent but it will eventually benefit the Industry as improved methods of cultivation will be adopted by the cane growers. In justifying the imposition of this additional burden on the Industry, the Hon'ble Minister observed as follows :—

“I have throughout emphasised the need of an intensive campaign for the improvement of cane cultivation which will enable our cultivators to grow cane at very much lower cost than at present by increasing the yield per acre and the sucrose content. It is obvious that this gigantic task cannot be undertaken by the Provincial Government with its existing resources. The allotments which have been made to us by the Government of India from the sugar excise fund are also hopelessly inadequate. Unless, therefore, we can find some means of raising additional fund, our cultivators will continue to grow cane according to existing inefficient methods and the Industry will not be able to make any further progress. We have, therefore, been compelled to include a provision providing for fresh taxation.”

Conclusion.

The said Act is a novel piece of legislation in India. It is probably the first attempt of its kind in India to stabilise an Industry, with which the interests of millions of agriculturists are involved, through State control.

Although it is too premature to anticipate the result of the working of this Act but it must be admitted that a very bold attempt has been made to consolidate the different units of the Industry on sound footing. A careful perusal through the different provisions of the Act will convince any body that all possible precautions have been taken to safeguard the interests of the growers for the simple reason that the existence of a sugar factory depends on continuous and regular supply of cane. This, in turn, depends on the price which a grower obtains for his cane. The Act has been conceived to control the Industry in all its aspects from field to the market. The interests of the consumers have been safeguarded by the inclusion of a number of Government representatives in the Board of Directors of the Syndicate. It has been provided to consult the Industry in almost all important matters through the establishment of a Sugar Control Board and Advisory Committees.

The entire credit for this enactment goes to the Hon'ble Dr. Syed Mahmud, Minister for Education and Development, Bihar, who is now known all over India for his yeoman's services for the cause of Industry in Bihar. Besides this important legislation, he has also conceived the grand idea of the electrification of the rural areas in Bihar, which when translated into action, will mark a new era in the industrial regeneration of the province. The most learned speech, which he delivered in moving the consideration of the Bill before the Bihar Legislative Assembly which led to this enactment, should be read and re-read by every one connected with this Industry. In bringing this chapter to an end, we whole-heartedly support the desire of the Hon'ble Minister as expressed through the following lines :—

“We realise that this legislation is new in India and its success will depend on the co-operation of all the parties—Government, sugar factories and cane growers.”

CHAPTER VIII.

Imposition of Excise Duty.

Its Effect.

The enactment of the Sugar (Excise Duty) Act, 1934, imposing an Excise Duty of Rs. 1/5/- per cwt. upon vacuum pan sugar and -/10/- per cwt. upon Khandesari sugar and a subsequent enactment in 1937, enhancing the rates of Excise Duty from Rs. 1/5/- to Rs. 2/- per cwt. on factory made sugar and from -/10/- to Re. 1/- on Khandesari sugar should be regarded as a "dark chapter" in the annals of industrial regeneration in India. The Act of 1934 was passed against the teeth of all opposition and the rates of Duty were enhanced in 1937 against the adverse verdict of the Central Legislative Assembly. In their zeal to balance their Budget by crippling this Industry, the Government of India did not even wait for the publication of the Report of the Second Tariff Board when the rates of Duty were increased by them from February, 1937. The united opposition of the entire "Commercial India" was of no avail and the Duty was enhanced by the Governor-General by resorting to his power of Certification. In imposing this Excise Duty, the Government of India sacrificed the principle that to levy excise on a product, which depends for its manufacture on an agricultural produce, is a definite step calculated to curb that Industry.

In moving the consideration of the Bill imposing the first Excise Duty before the Central Legislative Assembly on the 13th. March, 1934, the Hon'ble Finance Member advanced the

following arguments justifying the decision of the Government to impose the Duty :—

1. First, the danger of continuing a stimulus which is in excess of what Government decided to be necessary as a measure of protection.
2. Secondly, the need to ensure that the agricultural producers get full measure of benefit out of the policy of protection.
3. Thirdly, the replacement of revenue losses which represents the cost to the general public of India of giving protection to a limited number of manufacturers.

Those who have fully studied the growth and development of this Industry in India will admit that the first two arguments of the Hon'ble Finance Member were mere conjectures and could not be substantiated by the subsequent events of the Industry. In spite of the imposition of this Excise Duty in 1934, the number of sugar factories in India has increased by leaps and bounds. It has not been possible for the Government to check the over-production of sugar by the imposition of Excise Duty. It has been proved in other advanced sugar producing countries of the world that the regulation of production is the only means by which the output of an Industry can be regulated and controlled. The argument of the Hon'ble Finance Member that the cultivators will be benefited from this Excise Duty is rather amusing. The actual conditions of the cane growers tell a different tale altogether. If the growers had been benefited from the Excise Duty of 1934, they should have been then doubly benefited from its enhancement in 1937. But the serious agrarian troubles which followed in U. P. and Bihar, just after the enhancement of Excise Duty

in 1937, are the facts which will not support the contention of the Hon'ble Finance Member. Being faced with a serious trade depression and the sudden increase in Excise Duty, the Mill-owners decided to stop their crushing much earlier than the usual season. Huge amount of cane crop was threatened to be left unconsumed and the growers were in a fix and confusion. The Working Committee of the Indian National Congress appealed to the manufacturers to continue their crushing even at a loss just to save the growers. The minimum price of cane in U. P. and Bihar had to be gradually decreased to $-\frac{3}{4}$ and $-\frac{2}{6}$ a md. respectively. The position of the growers would have been otherwise if the manufacturers did not respond to the appeal of the Working Committee of the Congress. It will now, therefore, appear that the conditions of the growers have been worsened due to the imposition of Excise Duty.

It is a fact that due to the gradual development of this Industry, the import duty on sugar declined sharply. But it was a logical conclusion of the policy of protection. It was known to the Government of India that with the growth of this Industry, the import duty of sugar is bound to fall and the Government will sustain a loss in their custom revenue. In fact, this loss of revenue was the only argument advanced by the Government to enhance the Excise Duty in 1937. It was stated by the Hon'ble Finance Member that the main single cause of the present weakness in revenue position is a virtual disappearance of the revenue from the import of sugar. It was further argued by the Government that the average loss from this revenue was Rs. $10\frac{3}{4}$ crores. But an analysis of the figures of collection of customs revenue from the import of sugar for four financial years preceeding to 1930-31, does not support the said figure of loss at all. The year 1930-31 was a year of exceptional import and should not be taken advantage of as an average loss. The actual figures of import duty from sugar before 1930-31 were approximately Rs. $7\frac{1}{2}$ crores, Rs. $6\frac{1}{2}$ crores, Rs. $7\frac{3}{4}$

crores and Rs. 8½ crores only. This was the position of loss of customs revenue during the pre-protective period.

Let us now analyse this position during the post-protection period :—

<i>Year.</i>	<i>Import Duty.</i>
1932-33	Rs. 6,84,00 000/-
1933-34	Rs. 4,72,04,000/-
1934-35	Rs. 3,81,35,005/-
1935-36	Rs. 3,24,10,000/-
1936-37	Rs. 50,51,484/-
1937-38	Rs. 50,00,000/-

Average — Rs. 3,27,00,061/-

It will thus be evident that on an average, the Government of India have sustained an average loss of less than Rs. 3½ crores per annum from the fall of import duty on sugar during the whole period after the protection was granted. But against this loss, the Government have realised the following proceeds from this Industry :—

1. From Excise Duty.

<i>Year</i>	<i>Amount of Duty realised.</i>
1934-35	Rs. 97,22,000/-
1935-36	Rs. 1,58,84,000/-
1936-37	Rs. 2,52,49,000/-
1937-38	Rs. 3,01,48,000/-
1938-39	Rs. 3,60,00,000/-

Average—Rs. 2,34,00,600/-

II. From increased customs duty on machinery, Rs.10,00,000/-

III. From increased income tax and super tax not only from factories but also from staff and other domestic trades supplying materials to the Sugar Industry Rs. 75,00,000/-

- IV. From increased revenue to Indian Railways
for carrying sugarcane, sugar, store materials
etc. etc. Rs. 90,00,000/-
- V. From Irrigation tax (for increased consump-
tion of irrigation water due to the extension
of cane cultivation) Rs. 5,00,000/-

The above statistics will convince all that the average loss of customs revenue from the import of sugar has been more than amply counterbalanced from the realisation of the different proceeds out of the growth of this Industry.

The imposition of this Excise Duty has neither benefited the manufacturers nor the growers. The profits of the manufacturers have dwindled down as a result of which attempts are being made by them to purchase the cane at cheap prices to the great detriment of the growers. This is specially the position in the Provinces except U. P. and Bihar where provisions have been made to regulate the price of cane. It is needless to emphasise upon the fact that had the manufacturers been able to pay a less amount of Excise Duty than Rs. 1/8/- per md., they would have been in a better position to pay better prices for cane.

Another effect of this Excise Duty has been that it has hit the manufacturers of Khandesari sugar. Being unable to bear this heavy burden, the production of this kind of sugar is gradually declining to an alarming extent. The following figures will justify our contention.

<i>Year</i>	<i>Quantity of cane crushed by Khandesari manufacturers.</i>
	Tons.
1931-32	5,300,000
1932-33	5,500,000
1933-34	4,600,000
1934-35	3,000,000
1935-36	2,000,000
1936-37	2,000,000

The authoritative figures of 1937-38 are not available but it can safely be predicted that the quantity of cane consumed by the Khandasari Industry would be much less than the previous years. Therefore, unless the Government of India take up the cause of this Industry in all seriousness, an important indigenous Industry of the people of U. P. and Bihar is bound to collapse. This means that the cultivation of cane will be contracted to a very great extent to the detriment to the growth of this Industry.

The other deleterious effect of this Excise Duty has been that the pressure of this burden has driven the Industry into the Indian States as will be evident from a number of sugar factories which have lately been started in some of the those States. Although the Indian States have been invited to impose an equivalent amount of Excise Duty upon sugar produced in their areas but there is no compulsion. It should be remembered that these States can give direct or indirect concession to the growth of this Industry in their respective jurisdiction to which the Government of India cannot legally take any objection. As a result of the expansion of this Industry in the Indian States, the market for sugar manufactured in British India is bound to be restricted. This is a point which should receive the immediate consideration of the Government of India.

It is known to all that at the beginning of a crushing season, the percentage of sugar is low as the cane remains immatured and again during the end of the season, the sucrose content falls sharply due to climatic changes. Therefore, crushing at those periods is bound to be unprofitable. These factors have become more important as the manufacturers have to pay an Excise Duty Rs 2/- per cwt. Consequently, the Mill-owners will be compelled to begin crushing at a time when the canes attain the maximum purity. This means that the season will be much shortened and it will have serious repercussions upon the cultivators as they will find great difficulties in disposing of their crop. We, therefore, apprehend that if this

burden of Excise Duty is being continued, the duration of crushing seasons in India is bound to be restricted.

The pernicious effects of the imposition of Excise Duty have been beautifully described by Mr. M. P. Gandhi in a note on this subject and which runs as follows :—

“The Government are committed to give protection of fifteen years, but in less than five years, they have begun to impose various handicaps on the Industry by levy of high Excise Duty, by a policy of inaction in regard to utilisation of molasses, by removal of the surcharge in customs duty etc. While it should be a matter for pride that the Indian Sugar Industry has made a phenomenal development within a short space of five years, the Government in their anxiety to secure increased customs revenue, are placing impediments in the further progress of the Industry. The Indian capitalist, in the hope of making fair profits, has invested a huge amount of money in this Industry, but he now finds to his surprise that the opportunity for reaping benefits from this protected Industry is fast disappearing due to the change brought about in the outlook of the Government towards development of industries, through a policy of protection even though it was adopted by them after a very careful deliberation. The cultivator has also increased the area under cane cultivation. If the Industry is handicapped, if some factories close down, he will also suffer, as he will be unable to dispose of his cane crop profitably. This will have adverse affects on the agricultural economy of the country in general, as, if he returns to other crops indiscriminately, he will bring about a fall in the price of other crops too.”

The only benefit which has been conferred on this Industry by the Government of India is that a portion of the Duty, being equivalent to 1 anna per cwt, has been set apart to serve as a fund for distribution among the provinces where white sugar has been produced for the purpose of fostering the growth of co-operative organisations among the cane growers

for the better supply of cane at the factories on co-operative basis. It will be noticed that whereas the Industry has to pay an Excise Duty of Rs. 2/- per cwt., a meagre amount of one anna per cwt. only has been set apart for the benefit of the growers. Since this announcement of the Government to allow a "rebate" of one anna per cwt. to the Industry, it has always clamoured and with good justification for higher amount of allocation of subsidy out of this Excise Duty.

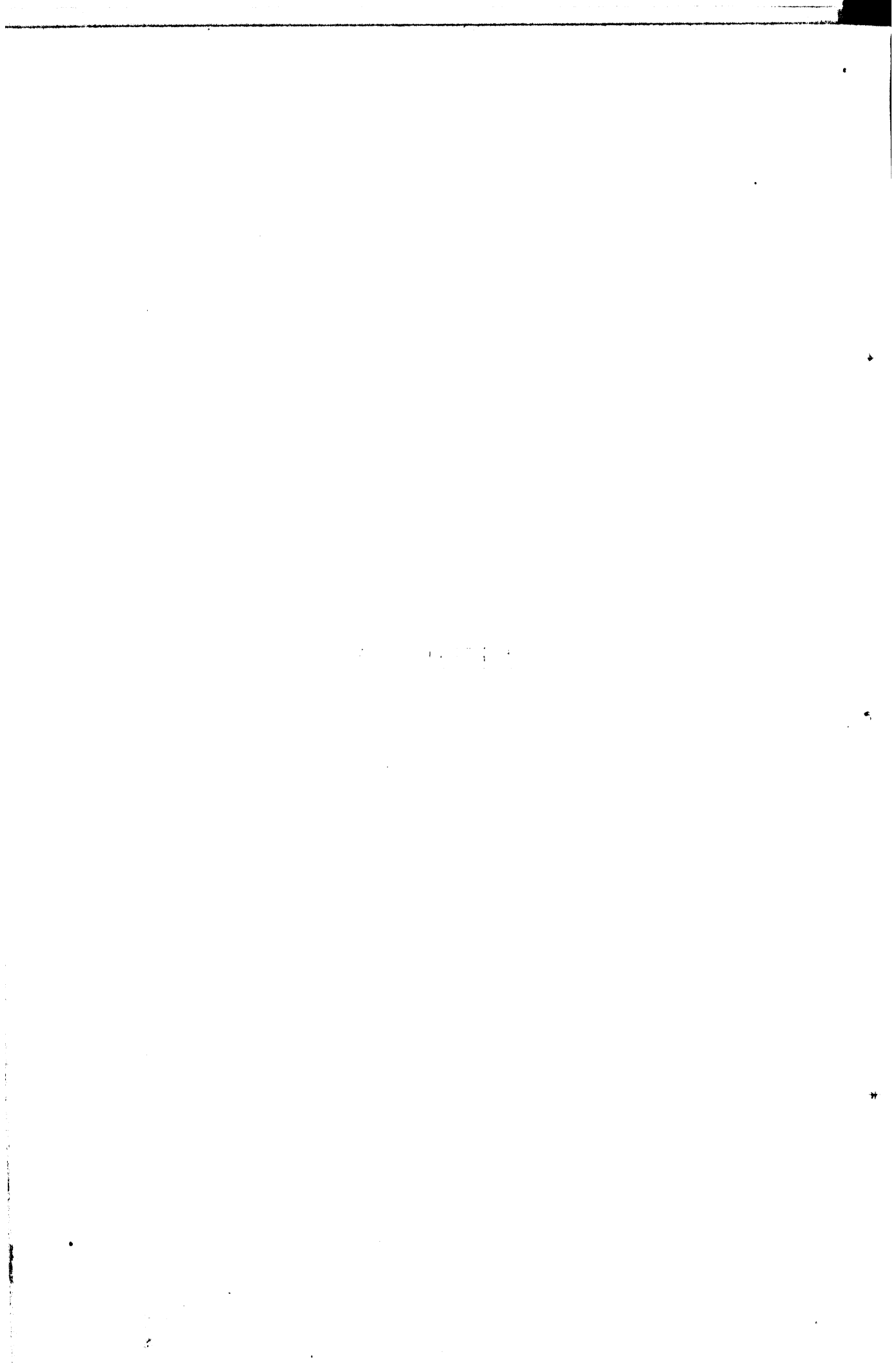
The U. P. Sugar Cane Conference, held in 18th June, 1937 passed an unanimous Resolution to the effect that this subsidy should be increased to -/3/- per cwt. The Sugar Committee of the Imperial Council of Agricultural Research has already recommended to the Government of India to increase this subsidy to -/2/- per cwt, but up till now the Government have not yet made their intention clear but the Industry confidently hope that they will accept the recommendations of the said Committee.

In bringing this chapter to conclusion, we again, want to emphasise upon the fact that the policy of imposing Excise Duty on indigenous industries should never be encouraged. The action of the Government of India in enhancing the rate of Excise Duty from February 1937 against the verdict of the Legislative Assembly is beyond comment. In their zeal to secure the equilibrium of their Budget at the cost of the Industry, they did not even care to wait for the publication of the report of the Tariff Board, a Committee appointed by themselves to investigate into the present position of this Industry. Moreover, it is believed in many reliable quarters that the Report of the said Tariff Board has not been released for publication simply for the reason that some of its recommendations, specially the recommendation for a substantial reduction in Excise Duty, have not been "palatable" to the Government. Although the Report was submitted by the Board in December 1937, the Government of India have not yet found time to go through this and arrive at concrete decisions. Such a valuable

document, concerning the future of this Industry, has been withheld from publication on the said plea. By passing an Act which has enabled the Government to continue the present rate of protection upto March 1939, the Industry has been forced to pay this prohibitive Excise Duty @ Rs. 2/- per cwt.

It should not be forgotten by the Government that the Indian capitalists have invested a sum of Rs. 33 crores in this Industry in the belief that it will enjoy the benefits of protection without being handicapped by this burden of Excise and other duties. We again repeat that the cultivators have been hardly hit by the imposition of this Excise Duty. One of the reasons which is responsible for the depression of this Industry is the enhancement of this Duty in 1937. It is high time that the Government of India should consider all these aspects before they finally take out their decisions with regard to the recommendations of the last Tariff Board. The Indian Sugar Industry is now the second largest Industry in India and has given relief to millions of cultivators and let us hope that the Government of India will take lessons out of the effects of the last depression and frame their budget proposals for the coming year (1938-39) in accordance to the present needs of the Industry. This prohibitive rate of Excise Duty should be substantially reduced to the great relief of the manufacturers as well as the growers.

APPENDIX A



Per capita consumption of sugar & gur in India.

(In lbs.)

<i>Year</i>	<i>Sugar</i>	<i>Gur</i>	<i>Total</i>
1932-33	5·6	20·2	25·8
1933-34	5·6	22·4	28·0
1934-35	5·6	23·0	28·6
1935-36	5·6	26·7	32·3
1936-37	7	27	34

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Provincial Distribution and Consumption of Sugar.

(1935-1936.)

<i>Name of the Province.</i>	<i>Production (In tons)</i>	<i>Consumption (In tons)</i>
United Provinces	374,000	125,000
Bihar & Orissa	202,000	105,000
Punjab	10,000	80,000
Madras	18,000	165,000
Bombay Presidency	23,000	95,000
Burma	14,000	35,000
Bengal	16,000	130,000

Total Production of Sugar in India.

(In tons)

	<i>Direct from Cane.</i>	<i>Khandsari Sugar.</i>	<i>From 'gur'</i>	<i>Total</i>
1932-33	2,90,177	2,75,000	80,106	6,45,283
1933-34	4,53,965	2,00,000	61,094	7,15,059
1934-35	5,78,115	1,50,000	40,000	7,68,115
1935-36	9,12,100	1,25,000	54,600	10,91,700
1936-37	1,128,900	1,25,000	32,300	12,86,200

Total Production, Import & Export of Molasses.

<i>Year</i>	<i>Production in India. (In Thousand tons).</i>	<i>Import in India. (tons).</i>	<i>Export out of India (all classes) (tons).</i>
1932-33	461	31,991	740
1933-34	430	2,401	1,201
1934-35	406	415	1,153
1935-36	495	Nil	1,026
1936-37	550	Nil	24,195

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**Total acreage under cane, average per
acre production in India.**

<i>Year</i>		<i>Total acreage under cane</i>	<i>Per acre Production (In tons).</i>
1932-33	...	3,435,000	15
1933-34	...	3,433,000	15
1934-35	...	3,602,000	15
1935-36	...	4,141,000	15
1936-37	...	4,300,000	15.3

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**Average Percentage of Recovery of Sugar
in India Comparison with Java.**

<i>Year.</i>	<i>India,</i>	<i>Java.</i>
1931-32	8.89 p. c.	11.92 p. c.
1932-33	8.66 p. c.	11.10 p. c.
1933-34	8.80 p. c.	12.64 p. c.
1934-35	8.80 p. c.	12.35 p. c.
1935-36	9.29 p. c.	13.21 p. c.
1936-37	9.50 p. c.	—

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Customs Duty from Import of Sugar.

<i>Year</i>		<i>Value in Rupees</i>
1932-33	...	6,84,00,000
1933-34	...	4,72,04,000
1934-35	...	3,81,35,000
1935-36	...	3,23,77,000
1936-37	...	50,51,484

Increase of Sugar Factories in India during the last Five years.

<i>Year</i>		<i>No. of Working Factories</i>		<i>Amount of cane Crushed. (In tons)</i>
1932-33	...	57	...	3,350,231
1933-34	...	112	...	5,147,073
1934-35	...	130	...	6,672,330
1935-36	...	137	..	9'801,000
1936-37	...	146	...	11,315,000

Provincial Distribution of Sugar Production in India.

(For 1935-36 crop season)

<i>Name of the Province.</i>	<i>No. of factories working</i>	<i>Cane Crushed (In tons)</i>	<i>Sugar Produced (In tons)</i>	<i>Percentage Recovery</i>
United Provinces	68	4,180,000	374,000	8.90
Bihar & Orissa	34	2,281,000	102,000	8.80
Punjab	5	130,000	10,000	8.00
Madras	9	204,000	18,000	9.00
Bombay	9	226,000	23,000	10.00
Bengal	7	200,000	16,000	8.00
Burma	2	180,000	14,000	8.00
Indian States	9	309,000	27,000	8.80
Total	143	7,710,000	684,000	8.87

10

Provincial Distribution of Cane Acreage in India.
(For 1935-36 season)

<i>Provinces & States.</i>	<i>Acre</i> (<i>In 1000 acres</i>)	<i>Yield of 'gur'</i> (<i>In 1000 tons</i>)
United Provinces	2,249	3,336
Punjab	473	358
Bihar & Orissa	465	668
Bengal	325	560
Madras	121	313
N. W. F. Province	58	63
Assam	35	35
C. P. & Berar	30	49
Delhi	3	3
Mysore	50	53
Hyderabad	59	99
Baroda	3	3
Central India	5	5
Total	4,007	2,902

11

Total Import of Sugar into British India.

<i>Year</i>	<i>Quantity</i> (<i>In tons</i>).	<i>Value</i> (<i>In Rupees</i>).
1931-32	511,319	6,06,36,542
1932-33	362,707	4,17,84,671
1933-34	249,776	2,63,71,431
1934-35	220,328	2,04,67,091
1935-36	198,961	1,88,27,440
1936-37	13,979	

Total production of 'gur' in India.

<i>Year</i>	<i>Net production (In tons).</i>
1931-32	2,772,000
1932-33	3,245,000
1933-34	3,597,000
1934-35	3,692,000
1935-36	4,204,000

Provincial allocation as Subsidy out of the
Revenue of the Sugar Excise Duty.

<i>Province</i>	<i>Amount.</i>	
	<i>1935-36</i>	<i>1936-37.</i>
United Provinces	Rs. 5,40,000	Rs. 4,76,000
Bihar	Rs. 2,90,000	Rs. 2,46,500
Madras	Rs. 57,500	Rs. 31,500
Punjab	Rs. 30,000	Rs. 25,000
Burma	Rs. 30,000	Rs. 17,000
Bengal	Rs. 20,000	Rs. 25,500
Bombay	Rs. 30,000	Rs. 25,500
Orissa	Rs. 5,000	Rs. 5,000
Reserve for Central & special purposes	Rs. 1,91,000	Rs. 52,500
Total	Rs. 11,93,500	Rs. 9,04,500

14

Expenses Incurred on Sugar Research.
(Through the Imperial Council of Agricultural
Research, India.)

<i>Year.</i>		<i>Amount.</i>
1934-35	...	Rs 4,81,802
1935-36	...	Rs. 5,63,862
1936-37	...	Rs. 5,96,900
		(Estimated)

A sum of Rs. 18½ lakhs is to be added to the above amounts. This sum has been handed over to various Provincial Governments out of the Sugar Excise Fund during those three years.

15

Import of Sugar Machinery in India.

<i>Exporting countries</i>	<i>1933-34.</i> <i>Rs.</i>	<i>1934-35.</i> <i>Rs.</i>
United Kingdom	19,587,559	7,300,509
Germany	3,311,442	1,141,611
France	39,541	1,030,125
Netherlands	6,053,605	681,545
Czechoslovakia	1,113,491	183,818
Total	33,638,814	10,545,439

16

Total Consumption of Sugar in India.

1931-32	...	1,016,427 tons
1932-34	...	931,877 "
1934-35	...	1,014,898 "

17

Export of Java Sugar to British India.
(In metric tons.)

1930	...	1,072,417
1931	...	601,677
1932	...	491,969
1933	...	351,735
1934	...	351,751
1935	...	386,117

18

Average Provincial Distribution of
Cane Acreage.

Bengal	...	...	15 tons.
Madras	...	...	20 „
Bombay	...	...	20 „
Bihar	...	...	10 „
United Provinces	...	...	10 „
Punjab	...	...	10 „

19

Extraction percentage of 'gur' from cane.
(Provincial figures)

		<i>Bullock mill</i> (<i>Maunds</i>)	<i>Power mill</i> (<i>Maunds</i>)
Madras	...	9	10
Bombay	...	9'92	10'88
Bengal	...	10	10
Punjab	...	10	10

Cost of producing a md. of gur'.

<i>Provinces</i>	<i>Bullock mill</i> <i>Rs.</i>	<i>Power mill</i> <i>Rs.</i>
Madras	1/3/- to 1/5/4.	-/8/-
Bombay	1/9/-	1/7/-
Bengal	2/3/-	1/7/-
Punjab	1/4/- to 2/7/-	1/3/- to 1/10/-
United Provinces	2/6/11 to 2/13/10	1/3/1 to 1/5/1

Provincial Distribution of Factories working with Cane.

<i>Provinces.</i>	<i>Season</i> <i>1936-37.</i>		<i>Season</i> <i>1935-36.</i> <i>(Actual.)</i>	
United Provinces	...	71	...	67
Bihar and Orissa	...	36	...	35
Punjab	...	6	...	4
Madras	...	10	...	8
Bombay	...	6	...	6
Bengal	...	6	...	6
Burma	...	3	...	2
Indian States	...	8	...	9
Total		146	...	137

22

Analysis of Estimated Duration of Crushing Season.

<i>No. of working Days.</i>	Season 1936-37			Season 1935-36		Season 1934-35.	
	<i>United Provinces.</i>	<i>Bihar & Orissa.</i>	<i>All other Provinces.</i>	<i>All India</i>	<i>All India. Actual</i>	<i>All India</i>	<i>All India</i>
200 and over	...	...	...	...	...	...	...
175 to 199	...	1	...	1	2	2	...
150 to 174	...	5	12	3	20	28	9
125 to 149	...	31	13	7	51	52	20
100 to 124	...	18	2	4	24	33	53
75 to 99	...	3	1	6	10	12	26
50 to 74	...	2	...	1	3	7	10
25 to 49	...	...	...	1	1	2	8
	60	28	23	111	136	126	

23

Estimated Production of Sugar for Season,
1936-37.

<i>Provinces.</i>	<i>No. of Factories Working.</i>	<i>Cane Crushed. Tons.</i>	<i>Sugar Made. Tons.</i>	<i>Molasses Obtained. Tons.</i>	<i>Recovery Sugar per cent Cane.</i>	<i>Recovery Molasses per cent Cane.</i>
United Provinces	71	5,906,500	565,000	205,300	9.56	3.47
Bihar and Orissa	36	3,443,300	319,900	122,100	9.29	3.54
Punjab	6	165,000	13,900	5,800	8.42	3.51
Madras	10	242,800	22,600	10,200	9.30	4.20
Bombay	6	353,800	37,700	11,900	10.65	3.36
Bengal	6	274,600	23,600	11,200	8.59	3.71
Burma	3	196,700	18,000	8,800	9.20	4.47
Indian States	8	732,300	71,800	28,000	9.80	3.82
Total	146	11,315,000	1,072,500	402,300	9.47	3.55

24

Actual Production of Sugar for Season, 1935-36.

<i>Provinces.</i>	<i>No. of Factories Working.</i>	<i>Cane Crushed. Tons.</i>	<i>Sugar Made. Tons.</i>	<i>Molassas Obtained. Tons.</i>	<i>Recovery Sugar per cent Cane.</i>	<i>Recovery Molasses per cent Cane.</i>
United Provinces	67	5,533,000	530,000	182,600	9.60	3.30
Bihar & Orissa	35	2,803,000	250,200	97,200	8.93	3.46
Punjab	4	112,868	8,880	4,600	7.87	4.10
Madras	8	191,380	17,570	8,370	9.14	4.30
Bombay	6	283,000	29,650	9,500	10.47	3.35
Bengal	6	295,000	24,000	11,000	8.19	3.87
Burma	2	148,500	13,200	7,258	8.90	4.90
Indian States	9	435,000	38,600	16,600	8.70	3.60
Total	137	9,801,748	912,100	337,128	9.10	3.43

25

No. of Refineries in India.

<i>Provinces.</i>	<i>Pure Refi- neries.</i>		<i>Cane sugar Factories refining Gur.</i>		<i>Total No. of Refineries.</i>	
	1936.	1935.	1936.	1935.	1936.	1936.
United Provinces	3	4	1	2	4	6
Bihar	...	..	2	...	2	...
Punjab	1	2	...	...	1	2
Madras	3	3	2	2	5	5
Bengal	...	...	1	...	1	...
Burma	...	..	...	...	...	...
Total	7	9	6	4	13	13

26

Quantity of gur melted by Factories during 1936.

<i>Particulars</i>		<i>United Provinces</i>	<i>All other Provinces</i>	<i>All India</i>
		Tons	Tons	Tons
Maximum	...	27,336	12,900	27,336
Minimum	..	2,360	336	336
Average	...	13,218	3,833	6,729

27

Average Percentage Recovery of Sugar from gur during the Season 1936.

<i>Particulars.</i>	<i>United Provinces.</i>		<i>Other Provinces.</i>		<i>All-India.</i>	
	<i>1936.</i>	<i>1935.</i>	<i>1936.</i>	<i>1935.</i>	<i>1936.</i>	<i>1935.</i>
Maximum	56.03	59.81	66.06	63.80	66.06	63.80
Minimum	49.43	47.80	50.00	43.36	49.43	43.36
Average	55.54	56.58	59.80	59.74	57.74	57.83

28

Recovery of Sugar from gur during the Five Seasons 1932 to 1936.

<i>Province</i>	<i>Recovery of Sugar per cent Gur.</i>				
	<i>1932.</i>	<i>1933.</i>	<i>1934.</i>	<i>1935.</i>	<i>1936.</i>
United Provinces	53.50	51.21	55.16	56.58	55.54
All other Provinces	58.98	56.66	59.97	59.74	59.80
All India	55.10	52.95	56.96	57.83	57.23

Prices of Sugar.

(Mill Delivery Rates)

1931	...	Rs.10-10 a md.
1933	...	Rs. 8- 5 a md.
1936	...	Rs. 6-12 a md.
1937 (June)	...	Rs. 5-14 a md
1938 (May)	...	Rs. 7-8 to Rs. 7-10 a md.

Yield of Central Revenue from Excise Duty.

Present rate on factory sugar.....Rs. 2/- per cwt.

„ „ „ Khandshari sugar.....Re. 1/- „ „

The above rates have been enforced from 28th February, 1937

<i>Year</i>	<i>Total Revenue from Excise.</i>
	Rs.
1934-35	97,22,000/-
1935-36	1,58,84,000/-
1896-37	2,52,49,000/-
1937-38 (Estimated)	3,92,00,000/-

Production of 'gur' in India
for direct consumption.

<i>Year</i>	<i>Production</i>
	Tons.
1931-32	2,772,000
1932-33	3,245,000
1933-34	3,477,000
1934-35	3,692,000
1935-36	4,105,000
1936-37	4,454,000

APPENDIX B

APPENDIX B

1

World Production and Consumption of Sugar.

<i>Year.</i>	<i>Production</i> (<i>In thousands long tons</i>	<i>Consumption.</i> <i>raw value sugar</i>)
1931-32	26,431	26,724
1932-33	24,692	26,193
1933-34	25,709	26,287
1934-35	26,191	27,188
1935-36	28,846	29,231
1936-37	30,818	30,549
1937-38 (Estimated)	30,991	29,757

2

Consumption of Sugar in Soviet Russia.

<i>Year.</i>	<i>Consumption in metric tons.</i>
1931-32	1,467,915
1932-33	879,816
1933-34	1,134,304
1934-35	1,348,948
1935-36	2,373,622
1936-37	1,800,000

3

Consumption of Sugar in U. S. A.

<i>Year.</i>	<i>Consumption Long tons.</i>	<i>Per capita Consumption lbs.</i>	<i>Increase, Decrease per cent.</i>
1929	5,810,980	108·13	+4·84
1930	5,599,377	99·37	-3·64
1933	5,270,366	93·60	+1·08
1934	5,134,746	90·71	-2·57
1935	5,339,908	93·78	+3·99
1936	5,521,512	96·29	+3·40

4

Consumption of foreign sugar in United Kingdom.

<i>Year.</i>	<i>Consumption in tons.</i>
1934	2,035,921
1935	1,967,689
1936	2,186,928

5

Production of Sugar in South Africa.

<i>Year.</i>	<i>Total Acreage.</i>	<i>Production of cane (Short tons)</i>	<i>Sucrose per cent cane.</i>	<i>Production of sugar (Short tons)</i>
1931-32	289,053	3,130,783	13·84	325,899
1932-33	300,860	3,489,960	13·48	358,905
1933-34	336,500	3,673,375	13·88	391,173
1934-35	347,991	3,874,215	11·18	358,738
1935-36	355,714	3,867,551	13·65	417,318
1936-37	—	4,181,973	13·34	446,409

6

Production of Sugar in Egypt.

<i>Year.</i>	<i>Amount of cane crushed.</i>	<i>Production of raw sugar.</i>
	<i>(In thousands of metric tons.)</i>	
1930-31	1,174	122
1931-32	1,521	147
1932-33	1,680	170
1933-34	1,508	154
1934-35	1,305	137
1936-37	1,234	132

The average annual consumption of sugar in Egypt is about 140,000 tons.

7

Production of Sugar in Japan.

<i>Year.</i>	<i>Cane sugar in Piculs.*</i>	<i>Beet sugar in Piculs.</i>	<i>Total sugar in Piculs.</i>
1932-33	12,993,769	402,807	13,396,576
1933-34	13,085,721	383,455	13,469,176
1934-35	18,944,846	587,395	19,532,241
1935-36	17,794,181	515,871	18,310,052
1936-37	19,309,881	727,322	20,037,203
1937-38	21,329,820	797,000	22,126,890

(Estimated)

* One Picul = 100 kin = 60 kg. or 132.27 lbs.

The average annual consumption of sugar in Japan is 1,050,000 tons.

8

Production of Sugar in Australia.

<i>Year.</i>	<i>Cane Acreage.</i>	<i>Production of cane Tons</i>	<i>Sugar production, Tons.</i>	<i>Cane tons. Per Acre.</i>
1932	212,842	3,703,261	532,763	17·4
1933	238,169	4,879,946	666,741	17·4
1934	225,998	4,497,415	642,409	20·5
1935	238,931	4,500,749	646,760	19·9
1936	955,383	5,446,685	782,412	18·8

9

Per Capita Consumption in Different Countries.

<i>Countries.</i>	<i>Kilos per head.*</i>
Denmark	55·9 (Highest)
Great Britain	47·8
Irish Free State	38·7
France	25·1
Germany	23·4
U. S. S. R.	13·6
Italy	7·9
Turkey	4·6
Australia	48·0
U. S. A.	43·0
Union of South Africa	23·1
Japan	11·2
Java	4·5 (Lowest)

* 1 Kilo = 2½ lb

10

State Aid to Sugar Industry in Principal Countries of the World.

<i>Name of the Country .</i>	<i>Value in £.</i>
U. S. A.	40,500,000
Germany ...	34,000,000
France ...	12,000,000
United Kingdom ...	7,000,000
Australia ...	5,000,000
Holland ...	2,500,000

11

Yield of cane per acre in different Countries. (In tons per acre).

Hawaii (Irrigated)	...	...	67
" (General)	...	...	58
Java	...	...	54
Porto Rico	...	...	31
Egypt	...	...	31

12

*Consumption of Alcohol Motor Fuel in
different Countries for 1934.*
(In Thousand U. K. gallons).

Austria	...	...	1,018 gallons.
Brazil	...	...	7,000 "
Cuba	...	...	2,367 "
Czechoslovakia	...	...	13,190 "
France	...	...	54,400 "
Germany	...	..	45,580 "
Hungary	...	...	2,106 "
Italy	...	...	1,402 "
Jugoslavia	...	...	995 "
Latvia	...	...	1,350 "
Poland	...	...	1,700 "
Sweedon	...	...	2,400 "
United Kingdom	...	...	433.5 "

13

*Cost of production of Sugar in other important
Countries.*

		<i>Per Cwt.</i>	
		<i>s.</i>	<i>d.</i>
Cuba	...	8	4½
Fiji	...	12	3
British West Indies	...	12	4½
Hawaii	...	13	6½
South Africa	...	15	8½
Germany	...	15	11½
Formosa	...	17	7
U. S. (Beet)	...	18	8
Australia	...	23	0
Argentine	...	24	3

Rates of Import Duty on Sugar in other Foreign Countries.

(Per short ton = 2,00 lbs)

<i>Country.</i>			<i>£</i>	<i>s.</i>	<i>d.</i>
Germany	...	...	14	3	4
Czechoslovakia	...	...	18	13	4
France	...	...	12	8	4
Hungary	...	...	12	13	4
Poland	...	...	21	18	4
Finland	...	...	24	0	0
Spain	...	...	21	11	8
Peru	...	...	18	0	0
Argentina	...	...	19	15	0
Great Britain (90° polarisation)			10	8	4
Irish Free State	...	...	14	11	8
Barbados	...	...	16	8	4
Belgium	...	...	10	5	0

Approximate Retail Prices of Sugar in Different Countries of the World.

<i>Countries</i>	<i>Price per md.</i>		
	Rs.	as.	p.
U. S. S. R.			
(Soviet Russia)	82	8	0 (Highest)
Italy	35	3	0
Germany	33	2	0
Netherlands	28	2	0
Czechoslovakia	23	12	0
Turkey	21	14	0
Poland	20	10	0
Portugal	20	6	0
Australia	19	6	0
Newzealand	17	8	0
Union of South Africa	17	8	0
France	16	14	0
Irish Free State	16	14	0
U. S. A.	12	1	0
Great Britain	11	14	0
Belgium	10	10	0
Japan	10	10	0
Java	5	13	0
Cuba	5	0	0 (Lowest)

The Imperial Institute of Sugar Technology, Cawnpore.

Following the recommendations of the Indian Sugar Committee 1920, the Government of India have started the said Institute at Cawnpore from 1st of October, 1936. The Sugar Section of the Harcourt Butler Technological Institute has been merged with the Imperial Institute and the entire administration has been vested in the Imperial Council of Agricultural Research, India. Mr. R. C. Srivastava B. Sc., C. B. E.—an acknowledged authority in Indian Sugar Industry and Sugar Technologist to the said Council, has been appointed as the first Director of the Institute. The function of the Institute may be broadly divided into two parts.

1. As a Centre for Research Works.

The Institute is expected to carry out research works in the following directions :—

1. Problems of Sugar Chemistry.
2. The utilisation of the by-products of the Industry on a commercial basis.
3. Works on testing of new types of cane under factory conditions.
4. Several problems of Sugar Engineering and Chemistry.

The Institute will also collect the returns from factories in India analyse and tabulate them for making them available to the factories in the form of technical reports.

The nature of special research schemes, undertaken by the Institute for the present, is indicated below :—

1. Milling experiments.
2. Experiments on Pan-boiling.
3. „ „ „ molasses-road composition.
4. „ „ „ cane dryage.
5. „ „ „ rapid & slow cooling in crystallizer.
6. Works on the keeping quality of sugars.
7. „ „ „ maximum PH. of juice for settling.
8. „ „ „ use of different dye-stuffs in centrifugals.
9. „ „ „ Boiler efficiency.

II. As a Training Centre.

Particulars of Courses :—

1. Associateship of the Institute in Sugar Technology (A. I. I. S. T.)
Admission qualifications :—Degree of B. Sc. or M. Sc. in Physics, Chemistry and Mathematics.
Duration of Course :—Three years, including one season's training in the Institute factory and one season in outside factory.
2. Associateship of the Institute in Sugar Engineering (A. I. I. S. T.)
Admission qualifications :—Degree of B. Sc. in Mechanical and Electrical Engineering or equivalent qualifications.
Duration of Course :—Three years including one season in the Institute factory and one season in outside factory.
3. Fellowship of the Institute in Sugar Technology or Sugar Engineering (F. I. I. S. T.)
Admission qualifications :—Associate of the Institute or of recognised institutions abroad.
Duration of Course :—Two years during non-working period of cane factories and two seasons factory experience after qualifying for Associateship.

4. Sugar Boilers' Certificate Course.

Admission qualifications :—Intermediate Examination in Science or an equivalent qualification.

Duration of Course :—One year at the Institute. (Certificate to be granted after candidates have acquired at least two years' practical efficiency in Pan-boiling).

5. Short Courses will be provided on the following subjects for men employed in factories and possessing suitable technical and academic qualifications :—

(a)	Chemical Control—	Extending over	3 sessions.
(b)	Bacteriology	" "	2 "
(c)	Pan Boiling	" "	1 session
(b)	Fuel and Boiler Control	" "	1 "
(e)	Statistics	" "	1 "
(f)	Dutch Language	" "	1 "

The academic session of the Institute commences from the 10th of July and ends on the 15th of May every year.

The estimated expenses for the Institute are over Rs. 15'87 lakhs including Rs. 14'37 lakhs as recurring grant for a period of 5 years and Rs. 1½ lakhs as capital grant. This entire cost will be met out of the general revenues. Against this cost, receipts amounting to Rs. 2,25,000/- are expected during 5 years. The net expenses, to be incurred by the Government of India, for this Institute, will therefore be about Rs. 14 lakhs over a period of 5 years.

The Indian Sugar Mills Association.

A Short History.

The Indian Sugar Mills Association was started on the 30th June, 1932 with eleven members out of a total number of 57 mills working in India during that period. It has now on its roll 112 sugar factories (upto May, 1937) scattered throughout the country including those in Burma. The Association represents about 90 p. c. of the total cane crushing capacity of all factories in India. It is thus the most representative

organisation of the Industry and as such has been recognised by the Government of India as well as by the different Provincial Governments. It has got its Representatives on all Government bodies dealing with sugar, from the Sugar Committee of the Imperial Council of Agricultural Research, Advisory Board of the Bureau of Sugar Standards, Advisory Committee of the Imperial Institute of Sugar Committees in the Provinces of U. P. and Bihar. All questions, relating to the Sugar Industry are referred to this Association by the Governments and other public bodies. Within the six years of its existence, the Association has proved itself very useful to the Industry in various spheres. Apart from being a liaison body between the Government and the public on one hand and the Industry on the other, the Association has also done useful work in the collection of statistical data with regard to the Sugar Industry.

Its office is now located at 135, Canning Street, Calcutta.

APPENDIX C

**List of Important Research Works on Sugar-cane
carried out in India as financed by the Imperial
Council of Agricultural Research.**

<i>Place of Research.</i>	<i>Kind of work.</i>	<i>Grant sanctioned (usually for 5 years)</i>
1. Imperial Institute of Agricultural Research, Delhi.	(i) Mosaic & other diseases, of sugar cane.	Rs. 1,04,989/-
	(ii) Insect diseases & pests of sugar-cane.	Rs. 96,000/-
	(iii) Chemistry of Sugarcane.	Rs. 23,000/-
2. Sub-station of the Imperial Research Insti- tute at Karnal.	(i) Investigation on varie- ties of cane—which are better suited to the local conditions than those in actual cultivation.	
	(ii) Manurial experiments to increase the yield per acre.	
	(iii) Work on early and late varieties of cane with a view to prolong the cru- shing season.	Rs. 1,32,000/- (for 8 years from 1930)

<i>Place of Research.</i>	<i>Kind of work.</i>	<i>Grant sanctioned (usually for 5 years)</i>
3. Experimental Farm at Shahajanpur. (U. P.)	(i) Field experiments and physiological investigations of varieties of sugar-cane.	Rs. 1,01,200/-
	(ii) Scheme for seedling trials.	Rs. 11,230/-
4. Muzaffarnagar Farm (U. P.)	Sugar-cane Research scheme.	Rs. 1,01,260/-
5. University of Allahabad (under Dr. N.R. Dhar.)	Utilisation of molasses as fertilizers.	Rs. 9,360/- (For 3 years) from Jan. 1936
6. Institute of Agricultural Research (Benares Hindu University).	Physiological analysis of the effects of fertilizers on sugar-cane.	Rs. 67,920/-
7. N. W. F. Provinces.	For the establishment of a Sugar-cane Research Station in the Charsadda District where varietal, manurial and other tests will be carried out.	Rs. 67,750/-
8. Jorhat Farm (Assam)	To work out effective schemes for the cultivation, manuring and management of cane and to find suitable varieties.	Rs. 63,000/-

<i>Place of Research.</i>	<i>Kind of work.</i>	<i>Grant sanctioned (usually for 5 years)</i>
9. The Dacca Sugar-cane Seedling Testing Station.	To test sugar-cane seedlings with a view to find their suitability to various conditions in Bengal.	Rs. 24,850/- (for 10 years)
10. Muzaffarpur (Bihar)	To select more suitable varieties of cane for the different areas of the Province, to find out disease-resistant varieties, early and late maturing types.	Rs. 2,25,850/-
11. At Padegaon Sugar-cane Research Station (Bombay).	Works on the effects of the soil conditions and water supply on the growth of sugar-cane.	Rs. 3,86,402/-
12. Mysore (Sugar-cane Investigations.)	Works on the breeding of thick sugar cane.	Rs. 21,000/-
13. Coimbatore (Madras)	(i) Research on the genetics of sugarcane. (ii) Sugarcane Research scheme.	Rs. 3,74,000/- Rs. 1,50,000/-
14. Layallpur (Punjab)	(i) Improvement of the indigenous ways of making 'gur' and sugar.	Rs. 1,33,000/-

<i>Place of Research.</i>	<i>Kind of work.</i>	<i>Grant sanctioned (usually for 5 years)</i>
15. Cawnpore.	(i) Imperial Institute of Sugar Technology—met from general revenues.	
	(ii) Improved juice boiling 'bel' under the direction of the Sugar Technologist.	Rs. 32,610/-
	(iii) Bureau of Sugar Standards	Rs. 32,610/-
	(iv) Utilization of molasses as cattle food.	Rs. 10,000/-
		Total Rs. 23,11,852/-

Provincial Summary of the working of the Seasons, 1936-37, & 1937-38

Compiled by the Indian Sugar Mills Association, Calcutta.

Name of the Province.	No. of factories submitting returns.	Average number of days worked.	Total cane crushed. (mds.)	Total sugar made. (mds)	Molasses produced. (mds)	Average Recovery.
Bengal	$\frac{1937-38}{1936-37}$ $\frac{6}{5}$	$\frac{91}{126.4}$	$\frac{60,58,000}{70,83,000}$	$\frac{5,47,763}{6,14,798}$	$\frac{1,74,669 (5)}{2,63,774}$	$\frac{8.415}{8.06}$
Bihar	$\frac{1937-38}{1936-37}$ $\frac{33}{33}$	$\frac{100}{155}$	$\frac{6,39,70,000}{9,87,88,000}$	$\frac{61,30,638}{90,61,939}$	$\frac{29,58,609 (32)}{24,69,70 (32)}$	$\frac{9.50}{9.19}$
U. P.	$\frac{1937-38}{1936-37}$ $\frac{64}{65}$	$\frac{122}{145}$	$\frac{15,19,34,000}{17,82,62,000}$	$\frac{1,41,42,901}{1,72,33,371}$	$\frac{55,61,971 (62)}{60,73,811 (62)}$	$\frac{9.26}{9.64}$
Punjab	$\frac{1937-38}{1936-37}$ $\frac{3}{3}$	$\frac{125}{134}$	$\frac{57,41,000}{56,23,000}$	$\frac{4,85,978}{4,97,965}$	$\frac{1,91,892}{1,83,552}$	$\frac{8.11}{8.56}$
Madras	$\frac{1937-38}{1936-37}$ $\frac{9}{9}$	$\frac{102}{108}$	$\frac{1,15,47,000}{96,32,000}$	$\frac{11,17,774}{9,50,487}$	$\frac{4,17,113 (7)}{3,74,972 (7)}$	$\frac{8.84}{8.57}$
Bombay	$\frac{1937-38}{1936-37}$ $\frac{8}{7}$	$\frac{137}{157}$	$\frac{1,33,09,000}{1,31,68,000}$	$\frac{13,79,806}{13,31,260}$	$\frac{4,76,733}{4,36,420}$	$\frac{10.65}{10.61}$
Sind	$\frac{1937-38}{1936-37}$ $\frac{1}{1}$	$\frac{58}{119}$	$\frac{3,82,000}{5,82,000}$	$\frac{28,152}{45,072}$	$\frac{15,727}{20,000}$	$\frac{7.36}{7.50}$
C. P.	$\frac{1937-38}{1936-37}$ $\frac{1}{1}$	$\frac{101}{122}$	$\frac{11,62,000}{17,17,000}$	$\frac{98,901}{1,32,376}$	$\frac{32,321}{42,954}$	$\frac{8.50}{7.71}$
Burma	$\frac{1937-38}{1936-37}$ $\frac{2}{2}$	$\frac{148}{127}$	$\frac{71,92,000}{49,84,000}$	$\frac{6,34,186}{4,72,348}$	$\frac{2,47,732}{2,21,491}$	$\frac{9.66}{9.18}$

Figures in brackets under the heading 'Molasses' represent the number of factories whose figures are available.

ALL INDIA AVERAGE

	No. of factories submitting returns.	Average number of days worked.	Total cane crushed (mds)	Total sugar made (mds).	Molasses produced (mds).	Average Recovery.
1937-38	125	114	35,41,03,000	2,39,31,913	89,25,945 (119)	9.29
1936-37	124	144	31,38,44,000	2,98,69,268	98,65,453 (117)	9.40

Total sugar produced by 125 factories submitting returns as stated above ... 2,39,31,913 Maunds,

Plus estimated production of sugar by the remaining factories ... 12,81,130 "

Total production of sugar for the season, 1937-38 by modern factories in India (excluding Burma, therefore, comes to ... Mds. 2,52,13,043 i.e. Tons 9,23,641

I. Important Statistics.

Present rate of import duty : —

- (a) Sugar—Rs. 9/1/- per cwt from 1st April, 1934.
—Rs. 9/4/- per cwt. from March, 1937.
- (b) Sugar candy—Rs. 10/8/-per cwt. from 20th February, 1934.
- (c) Molasses—31 p.c. *ad valorem* from April, 1932.

II. Production of Sugar in the previous two seasons.

<i>Year</i>	<i>Production in tons.</i>
1936-37	11,11,400.
1937-38	9,23,650.

Production of the last crop was less by 1,87,750 tons than in the previous year.

III. Second Forecast of all India Sugar Cane crop.

<i>Year</i>	<i>Area (acres)</i>	<i>Decrease (minus per cent)</i>
1937-38	3,842,000 (actual)	
1938-39	3,370,000	—12

The crop of the present season (1938-39) has been affected due to excessive rains and floods and damaged by insects and pests.

